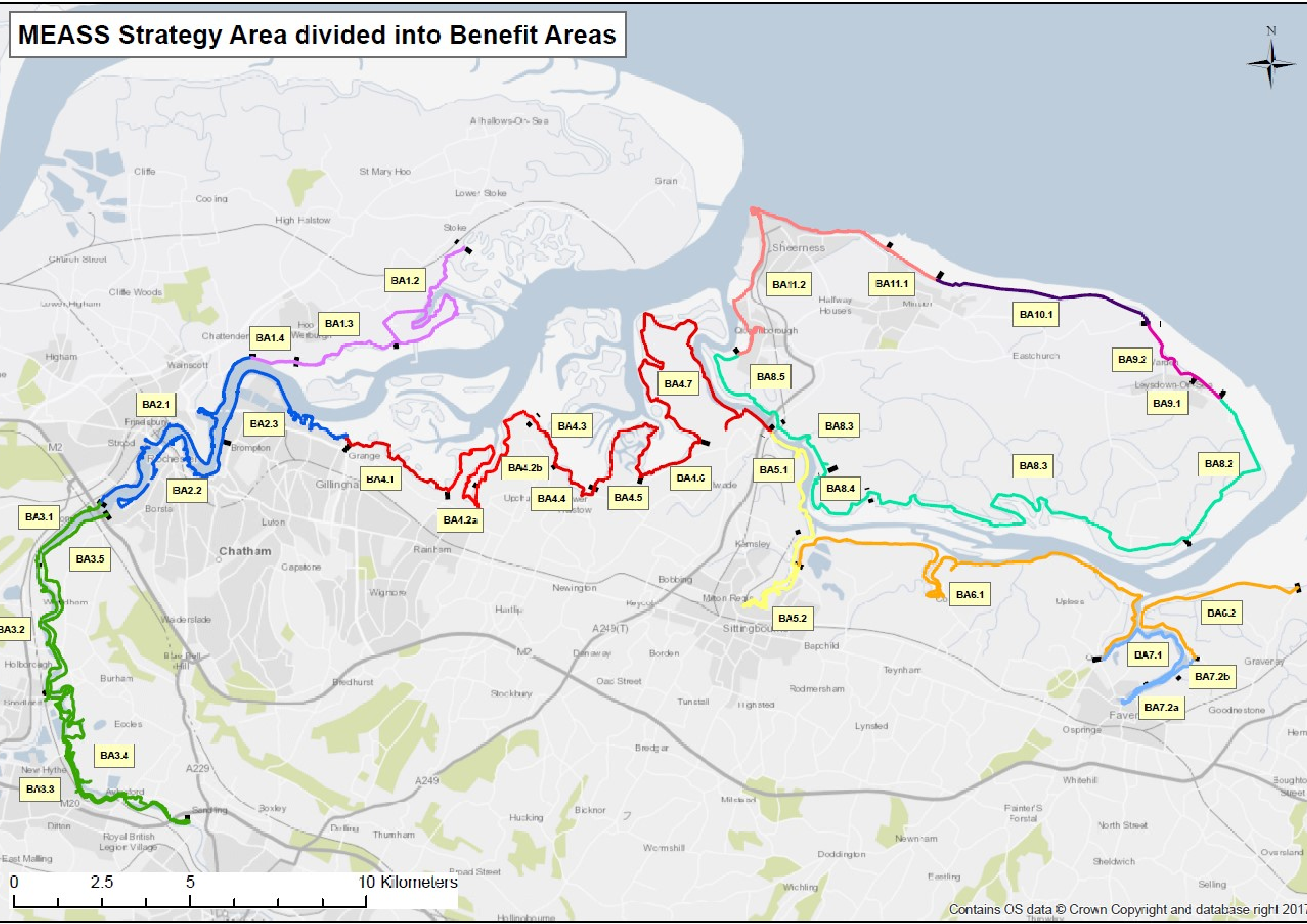
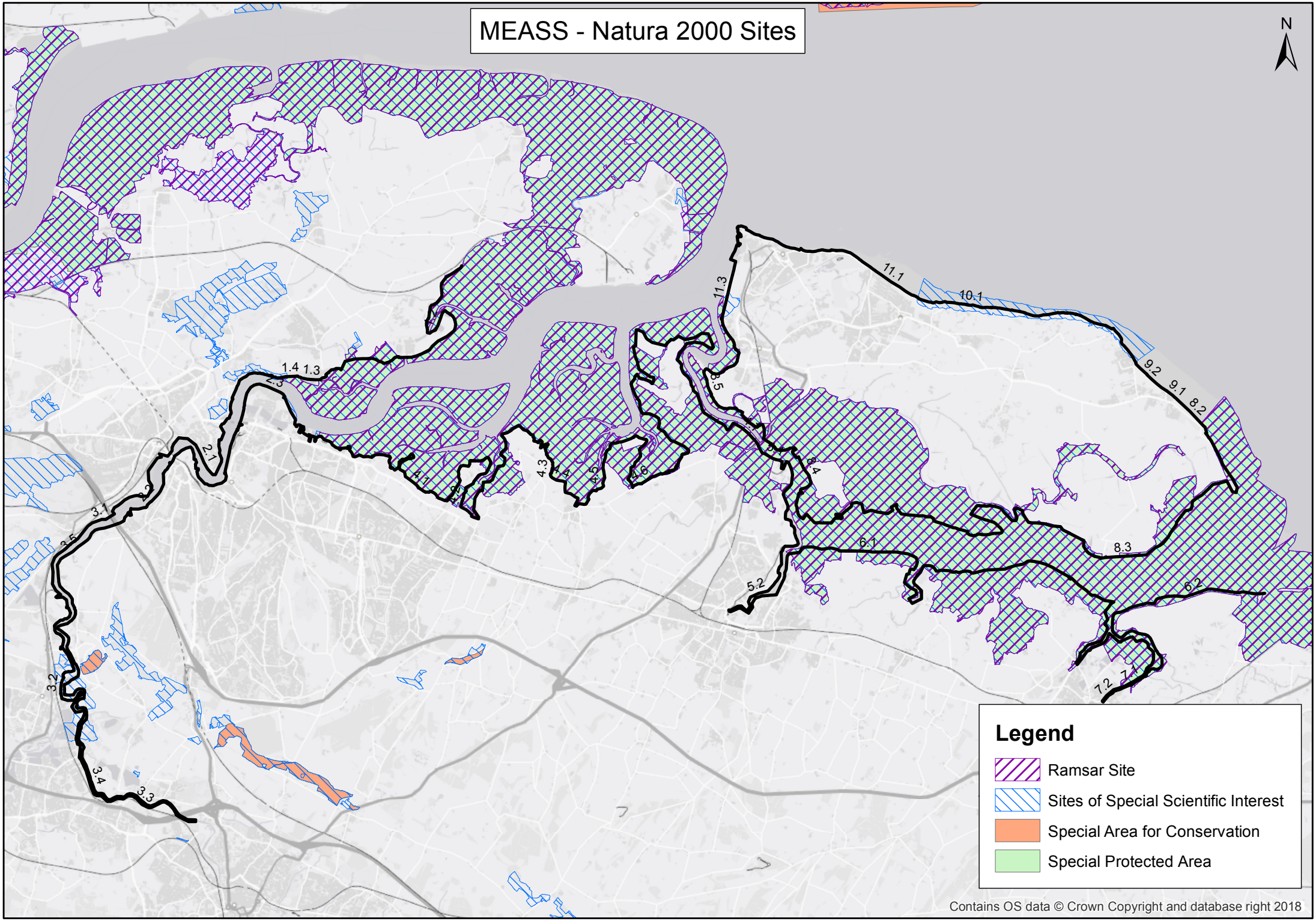
Appendices

A. The Study Area

A.1 The Study Area and Benefit Areas


MEASS Strategy Area divided into Benefit Areas
N
BA1.2
BA1.3
BA1.4
BA2.1
BA2.2
BA2.3
BA3.1
BA3.2
BA3.3
BA3.4
BA3.5
BA4.1
BA4.2a
BA4.2b
BA4.3
BA4.4
BA4.5
BA4.6
BA4.7
BA5.1
BA5.2
BA6.1
BA6.2
BA7.1
BA7.2a
BA7.2b
BA8.2
BA8.3
BA8.3
BA8.4
BA8.5
BA9.1
BA9.2
BA10.1
BA11.1
BA11.2
Allhallows-On-Sea
Cliffe
St Mary Hoo
Grain
Cooling
Lower Stoke
High Halstow
Stoke
Sheerness
Church Street
Cliffe Woods
Halfway Houses
Minster
Higham
Chattenden
Wainscott
Eastchurch
Strood
Brompton
Grange
Gillingham
Borstal
Luton
Chatham
Capstone
Rainham
Kemsley
Newington
Bobbing
Wigmore
Hartlip
Walderslade
Milton Regis
Sittingbourne
Uplees
Graveney
A249(T)
M2
Danaway
Borden
Bapchild
Teynham
Burham
Bredhurst
Oad Street
Stockbury
Tunstall
Rodmersham
Goodnestone
Eccles
Lynsted
Ospringe
New Hythe
A229
Bredgar
Whitehill
A249
Boxley
Hucking
Bicknor
Ditton
Royal British Legion Village
Detling
Thurnham
North Street
Newnham
East Malling
Wormshill
Doddington
Eastling
Sheldwich
Overland
Selling
Wichling
0
2.5
5
10 Kilometers
Contains OS data © Crown Copyright and database right 2017

A.2 The Study Area and Natura 2000 Sites



A.3 Natura 2000 and Ramsar Site Citations

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 15 December 1993

3. Country:

UK (England)

4. Name of the Ramsar site:

Medway Estuary and Marshes

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 24 02 N 00 40 38 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Canterbury

On the north coast of Kent, within the Greater Thames estuary.

Administrative region: Kent

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 4696.74

Min. -1
Max. 3
Mean 1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A complex of rain-fed, brackish, floodplain grazing marsh with ditches, and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. Rare wetland birds breed in important numbers. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports a number of species of rare plants and animals. The site holds several nationally scarce plants, including sea barley *Hordeum marinum*, curved hard-grass *Parapholis incurva*, annual beard-grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, slender hare`s-ear *Bupleurum tenuissimum*, sea clover *Trifolium squamosum*, saltmarsh goose-foot *Chenopodium chenopodioides*, golden samphire *Inula crithmoides*, perennial glasswort *Sarcocornia perennis* and one-flowered glasswort *Salicornia pusilla*. A total of at least twelve British Red Data

Book species of wetland invertebrates have been recorded on the site. These include a ground beetle *Polistichus connexus*, a fly *Cephalops perspicuus*, a dancefly *Poecilobothrus ducalis*, a fly *Anagnota collini*, a weevil *Baris scolopacea*, a water beetle *Berosus spinosus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, the ground lackey moth *Malacosoma castrensis*, a horsefly *Atylotus latistriatuus*, a fly *Campsicnemus magius*, a solider beetle, *Cantharis fusca*, and a cranefly *Limonia danica*. A significant number of non-wetland British Red Data Book species also occur.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
47637 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):
Species with peak counts in spring/autumn:

Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	3103 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	3709 individuals, representing an average of 1.4% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied brent goose, *Branta bernicla bernicla*,	2575 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Common shelduck , *Tadorna tadorna*, NW Europe	2627 individuals, representing an average of 3.3% of the GB population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	1118 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)
Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	540 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	3021 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	8263 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.
Species with peak counts in spring/autumn:

Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	721 individuals, representing an average of 2% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, mud, shingle
Geomorphology and landscape	coastal, floodplain, intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The Medway Estuary feeds into and lies on the south side of the outer Thames estuary. It forms a single tidal system with the Swale and joins the Thames estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels, which drain around large islands of saltmarsh and peninsulas of grazing marsh. The mudflats are rich in invertebrates and also support beds of *Enteromorpha* and some eelgrass *Zostera* spp. Small shell beaches occur, particularly in the outer part of the estuary. Grazing marshes are present inside the sea-walls around the estuary. The complex and diverse mixes of coastal habitats support important numbers of waterbirds throughout the year.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Medway Estuary feeds into and lies on the south side of the outer Thames estuary. It forms a single tidal system with the Swale and joins the Thames estuary between the Isle of Grain and

Sheerness. It has a complex arrangement of tidal channels, which drain around large islands of saltmarsh and peninsulas of grazing marsh.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	58.3
H	Salt marshes	16.8
4	Seasonally flooded agricultural land	13.8
Other	Other	9.3
M	Rivers / streams / creeks: permanent	1.2
Tp	Freshwater marshes / pools: permanent	0.4
J	Coastal brackish / saline lagoons	0.2
E	Sand / shingle shores (including dune systems)	0.02

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The intertidal flats are of fine, silty sediment. The saltmarsh shows a transition from pioneer communities containing *Zostera* to high saltmarsh dominated by *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

The site holds several nationally scarce plants, including: *Hordeum marinum, Parapholis incurva, Polypogon monspeliensis, Puccinellia fasciculata, Bupleurum tenuissimum, Trifolium squamosum, Chenopodium chenopodioides, Inula crithmoides, Sarcocornia perennis, Salicornia pusilla*

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Mediterranean gull , *Larus melanocephalus*, Europe	10 apparently occupied nests, representing an average of 9.2% of the GB population (Seabird 2000 Census)
Black-headed gull , *Larus ridibundus*, N & C Europe	7050 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)
Sandwich tern , *Sterna (Thalasseus) sandvicensis sandvicensis*, W Europe	333 apparently occupied nests, representing an average of 3.1% of the GB population (Seabird 2000 Census)
Common tern , *Sterna hirundo hirundo*, N & E Europe	228 apparently occupied nests, representing an average of 2.2% of the GB population (Seabird 2000 Census)
Little tern , *Sterna albifrons albifrons*, W Europe	28 pairs, representing an average of 1.4% of the GB population (5 year mean 1991-1995)

Species with peak counts in spring/autumn:

Great cormorant , *Phalacrocorax carbo carbo*, NW Europe	271 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)
Little egret , *Egretta garzetta*, West Mediterranean	125 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	645 individuals, representing an average of 18.9% of the GB population (5 year peak mean 1998/9-2002/3)
Whimbrel , *Numenius phaeopus*, Europe/Western Africa	49 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	3575 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	68 individuals, representing an average of 11.3% of the GB population (5 year peak mean 1998/9-2002/3)
Ruddy turnstone , *Arenaria interpres interpres*, NE Canada, Greenland/W Europe & NW Africa	600 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Northern shoveler , *Anas clypeata*, NW & C Europe	214 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian oystercatcher , *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering	3632 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

European golden plover , *Pluvialis apricaria apricaria,* P. a. altifrons Iceland & Faroes/E Atlantic	4500 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

A total of more than twelve British Red Data Book species of wetland invertebrates have been recorded on the site, including:

Polystichus connexus, Cephalops perspicuus, Peocilobothrus ducalis, Anagnota collini, Baris scolopacea, Berosus spinosus, Malachius vulneratus, Philonthus punctus, Malacostoma castrensis, Atylotus latistriatus, Campsicnemus magius, Cantharis fusca, Limonia danica, Lestes dryas, Hydrochus ignicollis, Hydrophilus piceus, Dicranomyia danica and *Lejops vittata*.

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site

Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	
Private	+	+
Public/communal	+	+
Other	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Collection of non-timber natural products: (unspecified)	+	
Fishing: commercial	+	+
Fishing: recreational/sport	+	+
Gathering of shellfish	+	
Bait collection	+	
Permanent arable agriculture		+
Permanent arable agriculture	+	+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Hunting: recreational/sport	+	+
Industrial water supply	+	
Industry		+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Flood control	+	
Transport route	+	+
Urban development		+
Non-urbanised settlements		+
Military activities		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Water diversion for irrigation/domestic/industrial use	1		+	+	+
Dredging	1	Continued maintenance dredging for port facilities and jetties may be contributing to adverse effects, e.g. through removal of sediment from the estuary. Maintenance dredging is subject to regulation and will be assessed under a protocol currently being trialled by Defra.	+	+	+
Erosion	2		+		+
Eutrophication	2	The Medway shows symptoms of eutrophication, particularly growth of green algae which covers large areas of the intertidal mudflats in late summer. Studies by the Environment Agency also indicate that the waters in the Medway are hyper-nutrified for nitrogen and phosphorus.	+	+	+
Recreational/tourism disturbance (unspecified)	1		+		+
Transport infrastructure development	1	Construction of new road bridge on to Isle of Sheppey, resulting in loss of some designated habitat and disturbance during construction. Scheme was assessed under Habitats Regulations and compensatory habitat provided (outside current designated site).	+	+	+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Erosion - The North Kent Coastal Habitat Management Plan (CHaMP) has been produced (Anon. 2002). The Environment Agency is to produce a Shoreline Management Plan/Flood Defence Strategy for the in the Medway and Swale and decisions on future flood risk management will need to take into account the effects on features within the designated sites.
Large-scale trials of mudflat recharge to address erosion.

Eutrophication - Water quality and sources of nutrient inputs are subject to further investigation by the

Environment Agency as part of the Agency's review of consents under the Habitats Regulations. Stage 3 of the Review of Consents (appropriate assessment) is scheduled for completion by March 2006, at which point any consented discharges having an adverse effect on site integrity will be identified.
Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.
Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Intertidal invertebrates and biotopes are being surveyed as part of a project on behalf of English Nature and the Medway Swale Estuary Partnership. Additional surveys are being carried out by the Environment Agency and the water industry to investigate the effects of (off-site) water abstraction on the invertebrate communities and birds associated with (on-site) fresh water flows.

Habitat.
ENSIS monitoring.
Experimental mudflat recharge using dredging spoil.
MNCR littoral and sublittoral survey.
Kent Wildlife Habitat Survey, and North Kent Marshes Saltmarsh Survey (Kent County Council);
Botanical survey of sea walls in north Kent, and study of factors affecting the occurrence of nationally scarce plant species on sea walls in north Kent SSSIs (English Nature)

Other

A carrying capacity study (for recreational uses) is currently being funded by the Medway Swale Estuary Partnership.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Gillingham Riverside Country Park.
E.ON Oakham Marsh Nature Reserve
The Medway Wildlife Ranger Service provides information to recreational boat users during peak season.
The Medway Swale Estuary Partnership publications and website (www.medway-swale.org.uk) provide information on the environmental features and uses of the estuary.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

Yachting, angling, wildfowling, jet skiing, waterskiing, birdwatching. Bird watching occurs throughout the year and wildfowling is restricted to the period September to February. The remaining activities occur year-round but are more prevalent in the summer months. Disturbance from these activities is a current issue but is being addressed through further research, negotiation and information dissemination. In this context, a River Leisure Usage Survey has been carried out by the Medway Swale Estuary Partnership, and the Partnership is funding a carrying capacity study for recreational uses. The Kent Coastal Network is also organising a stakeholders working group to consider the impacts and management of jet-skis within this and other coastal sites in Kent.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Anon. (2002) *North Kent Coastal Habitat Management Plan: Executive summary*. English Nature, Peterborough (Living with the Sea LIFE Project) www.english-nature.org.uk/livingwiththesea/project_details/good_practice_guide/HabitatCRR/ENRestore/CHaMPs/NorthKent/NorthKentCHaMP.pdf

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP, Davidson, NC & Buck, AL (eds.) (1998) *Coasts and seas of the United Kingdom. Region 7 South-east England: Lowestoft to Dungeness*. Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)

Blair-Myers, CN (2003) *North Kent Marshes Saltmarsh Survey 2002*. Kent County Council, Maidstone

Bratton, JH (ed.) (1991) *British Red Data Books: 3. Invertebrates other than insects*. Joint Nature Conservation Committee, Peterborough

Buck, AL (ed.) (1993) *An inventory of UK estuaries. Volume 5. Eastern England*. Joint Nature Conservation Committee, Peterborough

Burd, F (1989) *The saltmarsh survey of Great Britain. An inventory of British saltmarshes*. Nature Conservancy Council, Peterborough (Research & Survey in Nature Conservation, No. 17)

Burton, NHK, Jones, TE, Austin, GE, Watt, GA, Rehfisch, MM & Hutchins, CJ (2003) *Effects of reductions in organic and nutrient loading on bird populations in estuaries and coastal waters of England and Wales*. English Nature Research Reports, No. 586

Carter Ecological Ltd. (2003) *Sea walls, North Kent Marshes 2002: Factors affecting the occurrence of nationally scarce plant species on sea walls in three North Kent SSSIs*. English Nature, Wye

Covey, R (1998) Chapter 6. Eastern England (Bridlington to Folkestone) (MNCR Sector 6). In: *Benthic marine ecosystems of Great Britain and the north-east Atlantic*, ed. by K. Hiscock, 179-198. Joint Nature Conservation Committee, Peterborough. (Coasts and Seas of the United Kingdom. MNCR series)

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Doody, JP, Johnston, C & Smith, B (1993) *Directory of the North Sea coastal margin*. Joint Nature Conservation Committee, Peterborough

English Nature (2001) *Swale and Medway European Marine Site: English Nature's advice given under Regulation 33(2) of the Conservation (Natural Habitats &c) Regulations 1994*. English Nature, Wye

Godfrey, A (2003) *Grazing Marsh Invertebrate Project: Site-Specific Report. Final Report to the Environment Agency/English Nature*. Environment Agency, West Malling / English Nature, Wye

Hill, TO, Emblow, CS & Northen, KO (1996) *Marine Nature Conservation Review Sector 6. Inlets in eastern England: area summaries*. Joint Nature Conservation Committee, Peterborough (Coasts and seas of the United Kingdom. MNCR series)

Kent County Council (1992) *North Kent Marshes study*. Kent County Council, Maidstone

Medway Swale Estuary Partnership (2000) *Strategy for the Medway and Swale Estuary*. Medway Swale Estuary Partnership, Faversham

Medway Swale Estuary Partnership (2001) *Medway and Swale River Leisure Usage Survey*. Medway Swale Estuary Partnership, Faversham

Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99*. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

North Kent Marshes Initiative (1997) *Medway Estuary and Swale Management Plan, Consultation draft*. North Kent Marshes Initiative

Ratcliffe, DA (ed.) (1977) *A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain*. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)

Shirt, DB (ed.) (1987) *British Red Data Books: 2. Insects*. Nature Conservancy Council, Peterborough

Stewart, A, Pearman, DA & Preston, CD (eds.) (1994) *Scarce plants in Britain*. Joint Nature Conservation Committee, Peterborough

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content*. Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Thames Estuary Conservation Group (n.d.) *The Thames estuary*. Thames Estuary Conservation Group

Wiggington, M (1999) *British Red Data Books. 1. Vascular plants*. 3rd edn. Joint Nature Conservation Committee, Peterborough

Williams, P (1996) *A survey of ditch flora in the North Kent Marshes SSSIs, 1995*. English Nature Research Reports, No. **167**

Williams, P & Ware, C [1997] *Ditch communities on the North Kent Marshes SSSIs*. English Nature Research Reports, No. **289**

Worsfold, TM, Grist, NC & Hunter, P (2004) *Review of intertidal invertebrate data available for the Medway, Swale and North Kent Marshes estuary systems, with recommendations for future work*. Medway Swale Estuary Partnership, Faversham

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 31 March 2000

3. Country:

UK (England)

4. Name of the Ramsar site:

Thames Estuary and Marshes

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 29 08 N 00 35 47 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Gravesend

Contains part of the north coast of Kent and part of the southern coast of Essex, straddling the Thames estuary.

Administrative region: Essex; Kent; Medway; Thurrock

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 5588.59

Min. -2
Max. 20
Mean 1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports one endangered plant species and at least 14 nationally scarce plants of wetland habitats. The site also supports more than 20 British Red Data Book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
45118 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	595 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1640 individuals, representing an average of 4.6% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	1643 individuals, representing an average of 3.1% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	7279 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	15171 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	1178 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Atlantic

b) biogeographic regionalisation scheme (include reference citation):
Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, mud, shingle
Geomorphology and landscape	coastal, floodplain, intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The marshes extend for about 15 km along the south side of the Thames estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea-wall, there is a small extent of saltmarsh and broad intertidal mudflats.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The marshes extend for about 15 km along the south side of the Thames estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea-wall, there is a small extent of saltmarsh and broad intertidal mudflats.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	49.6
4	Seasonally flooded agricultural land	38.6
Q	Saline / brackish lakes: permanent	4.2
Ss	Saline / brackish marshes: seasonal / intermittent	3.2
Other	Other	1.6
H	Salt marshes	1.3
E	Sand / shingle shores (including dune systems)	0.8
O	Freshwater lakes: permanent	0.7

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The intertidal flats are mostly fine, silty sediment, though in parts they are sandy. The saltmarsh shows a transition from pioneer communities containing *Zostera* to saltmarsh dominated by, for example, *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites communis* and *Bolboschoenus maritimus*. The saline lagoons have a diverse molluscan and crustacean fauna. Dominant plants in the lagoons include *Ulva* and *Chaetomorpha*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site:

Higher plants:

The site supports a population of the endangered least lettuce *Lactuca saligna*, and also supports several nationally scarce plants, including bulbous foxtail *Alopecurus bulbosus*, slender hare's-ear *Bupleurum tenuissimum*, divided sedge *Carex divisa*, saltmarsh goosefoot *Chenopodium chenopodioides*, sea barley *Hordeum marinum*, golden samphire *Inula crithmoides*, annual beard grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, stiff saltmarsh-grass *P. rupestris*, one-flowered glasswort *Salicornia pusilla*, clustered clover *Trifolium glomeratum*, sea clover *T. squamosum*, narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltei*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species with peak counts in spring/autumn:

Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	251 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Little egret , *Egretta garzetta*, West Mediterranean	54 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	23 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	38 individuals, representing an average of 6.3% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Common shelduck , *Tadorna tadorna*, NW Europe	1238 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)
Gadwall , *Anas strepera strepera*, NW Europe	359 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	288 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Rallus aquaticus*, Europe	6 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	607 individuals, representing an average of 17.8% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	6 individuals, representing an average of 4.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site:

Invertebrates:

The endangered species *Bagous longitarsis* occurs on the site.

The following vulnerable species occur on the site: a groundbug *Henestaris halophilus*, a weevil *Bagous cylindrus*, a ground beetle *Polystichus connexus*, a cranefly *Erioptera bivittata*, a cranefly *Limnophila pictipennis*, a horse fly *Hybomitra expollicata*, a hoverfly *Lejops vittata*, a dancefly *Poecilobothrus ducalis*, a snail-killing fly *Pteromicra leucopeza*, a solitary wasp *Philanthus triangulum* and a damselfly *Lestes dryas*.

The following rare species occur on the site: a ground beetle *Anisodactylus poeciloides*, the water beetles *Aulacochthebius exaratus, Berosus fulvus, Cercyon bifenestratus, Hydrochus elongatus, H. ignicollis, Ochthebius exaratus* and *Hydrophilus piceus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, a fungus beetle *Telmatophilus brevicollis*, a fly *Campsicnemus magius*, a horsefly *Haematopota bigoti*, a soldier fly *Stratiomys longicornis* and a spider *Baryphyma duffeyi*.

---

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
Private	+	+
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Fishing: commercial	+	
Fishing: recreational/sport	+	
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Permanent arable agriculture		+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Permanent pastoral agriculture	+	+
Hunting: recreational/sport	+	
Industrial water supply		+
Industry		+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Flood control	+	
Transport route	+	+
Urban development		+
Military activities	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Dredging	1		+	+	+
Erosion	2		+		+
Eutrophication	2	Studies by the Environment Agency indicate that the waters in the Thames estuary are hyper-nutrified for nitrogen and phosphorus.	+	+	+
General disturbance from human activities	1		+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Erosion - The North Kent Coastal Habitat Management Plan (CHaMP) has been produced. The Environment Agency is producing a Flood Defence Strategy for the Thames (Thames 2100) and decisions on future flood risk management will need to take into account the effects on features within the designated sites.
Studies of sediment transport and hydrodynamics within Thames estuary. Investigation of beneficial use of dredgings for mudflat recharge and creation of compensatory habitat.

Eutrophication - Water quality and sources of nutrient inputs are subject to further investigation by the Environment Agency as part of the Agency's review of consents under the Habitats Regulations. Stage 3 of the Review of Consents (appropriate assessment) is scheduled for completion by March 2006, at which point any consented discharges having an adverse effect on site integrity will be identified.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
Special Protection Area (SPA)	+	

Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	+

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl and Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Numbers of breeding waders have been monitored through the BTO/RSPB/English Nature/Defra survey Breeding Waders of Wet Meadows (2002).
Botanical surveys of vegetation of sea wall embankments and grazing marsh ditches have been carried out.
The distribution and extent of saltmarsh habitat has been mapped - North Kent Marshes Saltmarsh Survey (2002) (Blair-Myres 2003)
The RSPB monitors various species groups on its reserves within the site

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The RSPB manages a network of reserves within and adjacent to the site, which are promoted locally through existing community initiatives, and more widely through publications and via the internet. The site forms part of proposals for a north Kent 'Regional Park', being promoted to balance development in Kent Thameside (part of the Thames Gateway growth area). The Management Guidance for the Thames Estuary aims to increase awareness of conservation and is promoted by the Thames Estuary Partnership. The Thames Estuary Partnership has also produced the Tidal Thames Habitat Action Plan to raise awareness of and address biodiversity issues.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Yachting, angling, wildfowling, jet-skiing, water-skiing and birdwatching. Bird watching occurs throughout the year and wildfowling is restricted to the period September to February. The remaining activities occur year-round but are more prevalent in the summer months. Disturbance from these activities is a current issue but is being addressed through further research, negotiation and information dissemination.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Anon. (2002) *North Kent Coastal Habitat Management Plan: Executive summary*. English Nature, Peterborough (Living with the Sea LIFE Project) www.english-nature.org.uk/livingwiththesea/project_details/good_practice_guide/HabitatCRR/ENRestore/CHaMPs/NorthKent/NorthKentCHaMP.pdf

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP, Davidson, NC & Buck, AL (eds.) (1998) *Coasts and seas of the United Kingdom. Region 7 South-east England: Lowestoft to Dungeness*. Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)

Blair-Myers, CN (2003) *North Kent Marshes Saltmarsh Survey 2002*. Kent County Council, Maidstone

Buck, AL (ed.) (1993) *An inventory of UK estuaries. Volume 5. Eastern England*. Joint Nature Conservation Committee, Peterborough

Burd, F (1989) *The saltmarsh survey of Great Britain. An inventory of British saltmarshes*. Nature Conservancy Council, Peterborough (Research & Survey in Nature Conservation, No. 17)

Carter Ecological Ltd. (2003) *Sea walls, North Kent Marshes 2002: Factors affecting the occurrence of nationally scarce plant species on sea walls in three North Kent SSSIs*. English Nature, Wye

Covey, R (1998) Chapter 6. Eastern England (Bridlington to Folkestone) (MNCR Sector 6). In: *Benthic marine ecosystems of Great Britain and the north-east Atlantic*, ed. by K. Hiscock, 179-198. Joint Nature Conservation Committee, Peterborough. (Coasts and Seas of the United Kingdom. MNCR series)

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Dean, BJ, Webb, A, McSorley, CA & Reid, JB (2003) Aerial surveys of UK inshore areas for wintering seaduck, divers and grebes: 2000/01 and 2001/02. *JNCC Report*, No. **333**. www.jncc.gov.uk/page-2346

Doody, JP, Johnston, C & Smith, B (1993) *Directory of the North Sea coastal margin*. Joint Nature Conservation Committee, Peterborough

Kent County Council (1992) *North Kent Marshes study*. Kent County Council, Maidstone

English Nature (2001) *Thames Estuary European marine site: English Nature's advice given under Regulation 33(2) of the Conservation (Natural Habitats &c) Regulations 1994*. English Nature, Wye

Godfrey, A (2003) *Grazing Marsh Invertebrate Project: Site-Specific Report. Final Report to the Environment Agency/English Nature.* Environment Agency, West Malling / English Nature, Wye

Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99*. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

Ratcliffe, DA (ed.) (1977) *A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain*. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)

Shirt, DB (ed.) (1987) *British Red Data Books: 2. Insects*. Nature Conservancy Council, Peterborough

Stewart, A, Pearman, DA & Preston, CD (eds.) (1994) *Scarce plants in Britain*. Joint Nature Conservation Committee, Peterborough

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content*. Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Thames Estuary Partnership (1999) *Management Guidance for the Thames Estuary*. Thames Estuary Partnership, London

Thames Estuary Partnership (2003) *Tidal Thames Habitat Action Plan*. Thames Estuary Partnership, London. http://212.67.202.196/~teprep/dev/documents/uploaded/document/TTHAP.pdf

Wiggington, M (1999) *British Red Data Books. 1. Vascular plants*. 3rd edn. Joint Nature Conservation Committee, Peterborough

Williams, P (1996) A survey of ditch flora in the North Kent Marshes SSSIs, 1995. *English Nature Research Reports*, No. **167**

Williams, P & Ware, C [1997] Ditch communities on the North Kent Marshes SSSIs. *English Nature Research Reports*, No. **289**

Worsfold, TM, Grist, NC & Hunter, P (2004) *Review of intertidal invertebrate data available for the Medway, Swale and North Kent Marshes estuary systems, with recommendations for future work.* Medway Swale Estuary Partnership, Faversham

---

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK9012031**

SITENAME **Medway Estuary and Marshes**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
A	UK9012031

1.3 Site name

Medway Estuary and Marshes

1.4 First Compilation date	1.5 Update date
1993-12	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1993-12
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
0.677222222	51.40055556

2.2 Area [ha]:

4686.32

2.3 Marine area [%]

69.1

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKJ4	Kent

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo
B	A054	Anas acuta			w	697	697	i	P	G	B		C	
B	A056	Anas clypeata			w	76	76	i		G	C		C	
B	A052	Anas crecca			w	1824	1824	i		G	C		C	
B	A050	Anas penelope			w	4346	4346	i		G	C		C	
B	A053	Anas platyrhynchos			w	884	884	i		G	C		C	
B	A169	Arenaria interpres			w	561	561	i		G	C		C	
B	A059	Aythya ferina			w	4	4	i		G	C		C	
B	A675	Branta bernicla bernicla			w	3205	3205	i		G	B		C	
B	A672	Calidris alpina alpina			w	25936	25936	i		G	B		C	
B	A143	Calidris canutus			w	541	541	i		G	C		C	

B	A137	Charadrius hiaticula			w	768	768	i		G	B		C
B	A082	Circus cyaneus			w				P	DD	C		C
B	A037	Cygnus columbianus bewickii			w	16	16	i		G	C		B
B	A098	Falco columbarius			w				P	DD	C		C
B	A001	Gavia stellata			w				P	DD	C		
B	A130	Haematopus ostralegus			w	3672	3672	i		G	C		C
B	A616	Limosa limosa islandica			w	957	957	i		G	B		C
B	A160	Numenius arquata			w	1900	1900	i		G	C		C
B	A017	Phalacrocorax carbo			w	231	231	i		G	C		C
B	A141	Pluvialis squatarola			w	3406	3406	i		G	B		C
B	A005	Podiceps cristatus			w	67	67	i		G	C		C
B	A132	Recurvirostra avosetta			w	314	314	i		G	B		B
B	A132	Recurvirostra avosetta			r	28	28	p		G	B		B
B	A195	Sterna albifrons			r	28	28	p		G	C		C
B	A193	Sterna hirundo			r	77	77	p		G	C		C
B	A048	Tadorna tadorna			w	4465	4465	i		G	B		C
B	A164	Tringa nebularia			w	10	10	i		G	B		C
B	A162	Tringa totanus			w	3690	3690	i		G	B		C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	BBA	Breeding bird assemblage												X
B	WATR	Waterfowl assemblage			65496	65496	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N03	15.0
N10	15.0
N07	1.0
N09	1.0
N06	1.0
N02	67.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: alluvium 2 Terrestrial: Geomorphology and landscape: floodplain,coastal 3 Marine Geology: shingle,mud 4 Marine: Geomorphology: intertidal sediments (including sandflat/mudflat),estuary

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding) 6.2% of the GB breeding population 5 year mean, 1988-1992 Sterna albifrons (Eastern Atlantic - breeding) 1.2% of the GB breeding population 5 year mean, 1991-1995 Sterna hirundo (Northern/Eastern Europe - breeding) 0.6% of the GB breeding population Count,as at 1994 Over winter the area regularly supports: Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe) 0.2% of the GB population 5 year peak mean 1991/92-1995/96 Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding) 24.7% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Anas acuta (North-western Europe) 1.2% of the population 5 year peak mean 1991/92-1995/96 Anas clypeata (North-western/Central Europe) 0.8% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Anas crecca (North-western Europe) 1.3% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Anas penelope (Western Siberia/North-western/North-eastern

Europe) 1.6% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Arenaria interpres (Western Palearctic - wintering) 0.9% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Branta bernicla bernicla (Western Siberia/Western Europe) 1.1% of the population 5 year peak mean 1991/92-1995/96 Calidris alpina alpina (Northern Siberia/Europe/Western Africa) 1.9% of the population 5 year peak mean 1991/92-1995/96 Calidris canutus (North-eastern Canada/Greenland/Iceland/North-western Europe) 0.2% of the population 5 year peak mean 1991/92-1995/96 Charadrius hiaticula (Europe/Northern Africa - wintering) 1.6% of the population 5 year peak mean 1991/92-1995/96 Haematopus ostralegus (Europe & Northern/Western Africa) 1% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Limosa limosa islandica (Iceland - breeding) 12.9% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Numenius arquata (Europe - breeding) 1.7% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Pluvialis squatarola (Eastern Atlantic - wintering) 2% of the population 5 year peak mean 1991/92-1995/96 Tadorna tadorna (North-western Europe) 1.5% of the population 5 year peak mean 1991/92-1995/96 Tringa nebularia (Europe/Western Africa) 2.6% of the population in Great Britain No count period specified. Tringa totanus (Eastern Atlantic - wintering) 2.1% of the population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 65496 waterfowl (5 year peak mean 1991/92-1995/96) Including: Gavia stellata , Podiceps cristatus , Phalacrocorax carbo , Cygnus columbianus bewickii , Branta bernicla bernicla , Tadorna tadorna , Anas penelope , Anas crecca , Anas platyrhynchos , Anas acuta , Anas clypeata , Aythya ferina , Haematopus ostralegus , Recurvirostra avosetta , Charadrius hiaticula , Pluvialis squatarola , Vanellus vanellus , Calidris canutus , Calidris alpina alpina , Limosa limosa islandica , Numenius arquata , Tringa totanus , Tringa nebularia , Arenaria interpres

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	M02		B
H	I01		B
H	M01		B
H	G01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	D05		I
H	A02		I
H	A06		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/3212324
http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK9012031**

SITENAME **Medway Estuary and Marshes**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
A	UK9012031

1.3 Site name

Medway Estuary and Marshes

1.4 First Compilation date	1.5 Update date
1993-12	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1993-12
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
0.677222222	51.40055556

2.2 Area [ha]:

4686.32

2.3 Marine area [%]

69.1

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKJ4	Kent

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo
B	A054	Anas acuta			w	697	697	i	P	G	B		C	
B	A056	Anas clypeata			w	76	76	i		G	C		C	
B	A052	Anas crecca			w	1824	1824	i		G	C		C	
B	A050	Anas penelope			w	4346	4346	i		G	C		C	
B	A053	Anas platyrhynchos			w	884	884	i		G	C		C	
B	A169	Arenaria interpres			w	561	561	i		G	C		C	
B	A059	Aythya ferina			w	4	4	i		G	C		C	
B	A675	Branta bernicla bernicla			w	3205	3205	i		G	B		C	
B	A672	Calidris alpina alpina			w	25936	25936	i		G	B		C	
B	A143	Calidris canutus			w	541	541	i		G	C		C	

B	A137	Charadrius hiaticula			w	768	768	i		G	B		C
B	A082	Circus cyaneus			w				P	DD	C		C
B	A037	Cygnus columbianus bewickii			w	16	16	i		G	C		B
B	A098	Falco columbarius			w				P	DD	C		C
B	A001	Gavia stellata			w				P	DD	C		
B	A130	Haematopus ostralegus			w	3672	3672	i		G	C		C
B	A616	Limosa limosa islandica			w	957	957	i		G	B		C
B	A160	Numenius arquata			w	1900	1900	i		G	C		C
B	A017	Phalacrocorax carbo			w	231	231	i		G	C		C
B	A141	Pluvialis squatarola			w	3406	3406	i		G	B		C
B	A005	Podiceps cristatus			w	67	67	i		G	C		C
B	A132	Recurvirostra avosetta			w	314	314	i		G	B		B
B	A132	Recurvirostra avosetta			r	28	28	p		G	B		B
B	A195	Sterna albifrons			r	28	28	p		G	C		C
B	A193	Sterna hirundo			r	77	77	p		G	C		C
B	A048	Tadorna tadorna			w	4465	4465	i		G	B		C
B	A164	Tringa nebularia			w	10	10	i		G	B		C
B	A162	Tringa totanus			w	3690	3690	i		G	B		C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	BBA	Breeding bird assemblage												X
B	WATR	Waterfowl assemblage			65496	65496	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N03	15.0
N10	15.0
N07	1.0
N09	1.0
N06	1.0
N02	67.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: alluvium 2 Terrestrial: Geomorphology and landscape: floodplain,coastal 3 Marine Geology: shingle,mud 4 Marine: Geomorphology: intertidal sediments (including sandflat/mudflat),estuary

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding) 6.2% of the GB breeding population 5 year mean, 1988-1992 Sterna albifrons (Eastern Atlantic - breeding) 1.2% of the GB breeding population 5 year mean, 1991-1995 Sterna hirundo (Northern/Eastern Europe - breeding) 0.6% of the GB breeding population Count,as at 1994 Over winter the area regularly supports: Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe) 0.2% of the GB population 5 year peak mean 1991/92-1995/96 Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding) 24.7% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Anas acuta (North-western Europe) 1.2% of the population 5 year peak mean 1991/92-1995/96 Anas clypeata (North-western/Central Europe) 0.8% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Anas crecca (North-western Europe) 1.3% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Anas penelope (Western Siberia/North-western/North-eastern

Europe) 1.6% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Arenaria interpres (Western Palearctic - wintering) 0.9% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Branta bernicla bernicla (Western Siberia/Western Europe) 1.1% of the population 5 year peak mean 1991/92-1995/96 Calidris alpina alpina (Northern Siberia/Europe/Western Africa) 1.9% of the population 5 year peak mean 1991/92-1995/96 Calidris canutus (North-eastern Canada/Greenland/Iceland/North-western Europe) 0.2% of the population 5 year peak mean 1991/92-1995/96 Charadrius hiaticula (Europe/Northern Africa - wintering) 1.6% of the population 5 year peak mean 1991/92-1995/96 Haematopus ostralegus (Europe & Northern/Western Africa) 1% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Limosa limosa islandica (Iceland - breeding) 12.9% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Numenius arquata (Europe - breeding) 1.7% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Pluvialis squatarola (Eastern Atlantic - wintering) 2% of the population 5 year peak mean 1991/92-1995/96 Tadorna tadorna (North-western Europe) 1.5% of the population 5 year peak mean 1991/92-1995/96 Tringa nebularia (Europe/Western Africa) 2.6% of the population in Great Britain No count period specified. Tringa totanus (Eastern Atlantic - wintering) 2.1% of the population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 65496 waterfowl (5 year peak mean 1991/92-1995/96) Including: Gavia stellata , Podiceps cristatus , Phalacrocorax carbo , Cygnus columbianus bewickii , Branta bernicla bernicla , Tadorna tadorna , Anas penelope , Anas crecca , Anas platyrhynchos , Anas acuta , Anas clypeata , Aythya ferina , Haematopus ostralegus , Recurvirostra avosetta , Charadrius hiaticula , Pluvialis squatarola , Vanellus vanellus , Calidris canutus , Calidris alpina alpina , Limosa limosa islandica , Numenius arquata , Tringa totanus , Tringa nebularia , Arenaria interpres

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	M02		B
H	I01		B
H	M01		B
H	G01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	D05		I
H	A02		I
H	A06		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/3212324
http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 31 August 1982

3. Country:

UK (England)

4. Name of the Ramsar site:

The Swale

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 21 39 N 00 50 21 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Faversham

On the north Kent of coast within the greater Thames estuary.

Administrative region: Kent

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 6514.71

Min. -1
Max. 5
Mean 2

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. Rare wetland birds breed in important numbers. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports nationally scarce plants and at least seven British Red data book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
77501 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Common redshank , *Tringa totanus totanus*,	1712 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied brent goose, *Branta bernicla bernicla*,	1633 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	2098 individuals, representing an average of 3.9% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	917 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Eurasian wigeon , *Anas penelope*, NW Europe	15296 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3)
Northern pintail , *Anas acuta*, NW Europe	763 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	483 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1504 individuals, representing an average of 4.2% of the population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	alluvium, clay, mud, sand, shingle
Geomorphology and landscape	coastal, floodplain, shingle bar, subtidal sediments (including sandbank/mudbank), intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The Swale is an estuarine area that separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The intertidal flats are extensive, especially in the east of the site. Locally there are large mussel *Mytilus edulis* beds formed on harder areas of substrate. There is much diversity both in the salinity of the dykes (which range from fresh to strongly brackish) and in the topography of the fields.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Swale is an estuarine area that separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mudflats. The intertidal flats are extensive, especially in the east of the site.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Human-made wetland, Marine/coastal wetland

Code	Name	% Area
4	Seasonally flooded agricultural land	47.7
G	Tidal flats	38
H	Salt marshes	5.8
Other	Other	5.7
N	Rivers / streams / creeks: seasonal / intermittent	1.8
E	Sand / shingle shores (including dune systems)	1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The intertidal flats are of fine, silty sediment. The saltmarsh is species rich, for example containing all southern species of *Puccinellia* and most *Salicornia* species. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

The site holds several nationally scarce plants, including: *Chenopodium chenopodioides, Peucedanum officinale, Bupleurum tenuissimum, Spartina maritima, Inula crithmoides, Carex divisa, Trifolium squamosum, Hordeum marinum*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Mediterranean gull , *Larus melanocephalus*, Europe	13 apparently occupied nests, representing an average of 12% of the GB population (Seabird 2000 Census)

Black-headed gull , *Larus ridibundus*, N & C Europe	3835 apparently occupied nests, representing an average of 2.9% of the GB population (Seabird 2000 Census)
Little tern , *Sterna albifrons albifrons*, W Europe	20 apparently occupied nests, representing an average of 1% of the GB population (Seabird 2000 Census)
Species with peak counts in spring/autumn:	
Little egret , *Egretta garzetta*, West Mediterranean	29 individuals, representing an average of 1.7% of the GB population (5 year peak mean 1998/9-2002/3)
Whimbrel , *Numenius phaeopus*, Europe/Western Africa	98 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3 - spring peak)
Eurasian curlew , *Numenius arquata arquata*, N. a. arquata Europe (breeding)	1779 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	60 individuals, representing an average of 44.1% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	49 individuals, representing an average of 8.2% of the GB population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	147 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Greater white-fronted goose , *Anser albifrons albifrons*, NW Europe	973 individuals, representing an average of 16.8% of the GB population (5 year peak mean for 1996/7-2000/01)
Common shelduck , *Tadorna tadorna*, NW Europe	2437 individuals, representing an average of 3.1% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian teal , *Anas crecca*, NW Europe	3610 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian oystercatcher , *Haematopus ostralegus ostralegus*, Europe & NW Africa -wintering	4609 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	380 individuals, representing an average of 11.1% of the GB population (5 year peak mean 1998/9-2002/3)
European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	7522 individuals, representing an average of 3% of the GB population (5 year peak mean 1998/9-2002/3)
Northern lapwing , *Vanellus vanellus*, Europe - breeding	15129 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	3004 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	9017 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	53 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Bagous cylindrus, Erioptera bivittata, Lejops vittata, Peocilobothris ducalis, Philonthus punctus, Micronecta minutissima, Malchius vulneratus, Campsicnemus majus, Elachiptera rufifrons, Myopites eximia.

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
Traditional cultural
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site

Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	
Recreation	+	
Current scientific research	+	
Fishing: commercial	+	
Fishing: recreational/sport	+	
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Livestock watering hole/pond	+	
Grazing (unspecified)	+	
Hay meadows	+	
Hunting: commercial	+	
Hunting: recreational/sport	+	
Industrial water supply		+
Industry		+
Sewage treatment/disposal		+
Harbour/port	+	+
Flood control	+	
Transport route	+	
Non-urbanised settlements	+	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Erosion	1		+		+

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	+

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Habitat.

ENSIS monitoring.
Hydrological monitoring of the grazing marsh.
MNCR Littoral and Sublittoral survey.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Swale NNR and Elmley NNR (both RSPB and Elmley Conservation Trust) all provide viewing facilities.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

Yachting, jet-skiing and water-skiing mostly in the summer, bird watching throughout the year and angling and wildfowling during their legally permitted seasons. Disturbance from these activities is a current issue but it is addressed through negotiation relating to activities consented within the SSSI and information dissemination. There is no clear evidence of damage from any of these activities.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Anon. (2002) *North Kent Coastal Habitat Management Plan: Executive summary*. English Nature, Peterborough (Living with the Sea LIFE Project) www.english-nature.org.uk/livingwiththesea/project_details/good_practice_guide/HabitatCRR/ENRestore/CHaMPs/NorthKent/NorthKentCHaMP.pdf

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP, Davidson, NC & Buck, AL (eds.) (1998) *Coasts and seas of the United Kingdom. Region 7 South-east England: Lowestoft to Dungeness*. Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)

Bratton, JH (ed.) (1991) *British Red Data Books: 3. Invertebrates other than insects*. Joint Nature Conservation Committee, Peterborough

Buck, AL (ed.) (1993) *An inventory of UK estuaries. Volume 5. Eastern England*. Joint Nature Conservation Committee, Peterborough

Burd, F (1989) *The saltmarsh survey of Great Britain. An inventory of British saltmarshes.* Nature Conservancy Council, Peterborough (Research & Survey in Nature Conservation, No. 17)

Covey, R (1998) Chapter 6. Eastern England (Bridlington to Folkestone) (MNCR Sector 6). In: *Benthic marine ecosystems of Great Britain and the north-east Atlantic*, ed. by K. Hiscock, 179-198. Joint Nature Conservation Committee, Peterborough. (Coasts and Seas of the United Kingdom. MNCR series)

Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) *The Wetland Bird Survey 1995–96: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge

Doody, JP, Johnston, C & Smith, B (1993) *Directory of the North Sea coastal margin*. Joint Nature Conservation Committee, Peterborough

Everett, MJ (1987) The Elmley experiment. *RSPB Conservation Review*, **1**, 31-33

Hill, TO, Emblow, CS & Northen, KO (1996) *Marine Nature Conservation Review Sector 6. Inlets in eastern England: area summaries*. Joint Nature Conservation Committee, Peterborough (Coasts and seas of the United Kingdom. MNCR series)

Kent County Council (1992) *North Kent Marshes study*. Kent County Council, Maidstone

Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99*. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

North Kent Marshes Initiative (1997) *Medway Estuary and Swale Management Plan, Consultation draft*. North Kent Marshes Initiative

Ratcliffe, DA (ed.) (1977) *A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain*. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)

Shirt, DB (ed.) (1987) *British Red Data Books: 2. Insects*. Nature Conservancy Council, Peterborough

Stewart, A, Pearman, DA & Preston, CD (eds.) (1994) *Scarce plants in Britain*. Joint Nature Conservation Committee, Peterborough

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content*. Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm

Thames Estuary Conservation Group (n.d.) *The Thames estuary*. Thames Estuary Conservation Group

Wiggington, M (1999) *British Red Data Books. 1. Vascular plants*. 3rd edn. Joint Nature Conservation Committee, Peterborough

Williams, P (1996) A survey of ditch flora in the North Kent Marshes SSSIs, 1995. *English Nature Research Reports*, No. **167**

Williams, P & Ware, C [1997] Ditch communities on the North Kent Marshes SSSIs. *English Nature Research Reports*, No. **289**

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK9012021**

SITENAME **Thames Estuary and Marshes**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
A	UK9012021

1.3 Site name

Thames Estuary and Marshes

1.4 First Compilation date	1.5 Update date
2000-03	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	2000-03
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
0.596388889	51.48555556

2.2 Area [ha]:

4802.47

2.3 Marine area [%]

55.7

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKJ4	Kent
UKH3	Essex

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo
B	A672	Calidris alpina alpina			w	29646	29646	i		G	B		C	
B	A143	Calidris canutus			w	4848	4848	i		G	C		C	
B	A137	Charadrius hiaticula			c	1324	1324	i		G	B		C	
B	A082	Circus cyaneus			w	7	7	i		G	C		C	
B	A616	Limosa limosa islandica			w	1699	1699	i		G	B		C	
B	A141	Pluvialis squatarola			w	2593	2593	i		G	C		C	
B	A132	Recurvirostra avosetta			w	283	283	i		G	A		C	
		Tringa												

B	A162	totanus			w	3251	3251	i		G	B		C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	WATR	Waterfowl assemblage			75019	75019	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N07	3.7
N06	5.6
N03	1.5
N09	1.9
N05	0.9
N10	29.1
N02	57.3
Total Habitat Cover	100.00000000000001

Other Site Characteristics

1 Terrestrial: Soil & Geology: shingle,alluvium,mud 2 Terrestrial: Geomorphology and landscape: coastal,floodplain 4 Marine: Geomorphology: estuary,intertidal sediments (including sandflat/mudflat)

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Circus cyaneus 1% of the population in Great Britain Five year peak mean for 1993/94 to 1997/98 Recurvirostra avosetta (Western Europe/Western Mediterranean - breeding) 28.3% of the population in Great Britain Five year peak mean for 1993/93 to 1997/98 ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Calidris alpina alpina (Northern Siberia/Europe/Western Africa) 2.1% of the population Five year peak mean for 1993/94 to 1997/98 Calidris canutus (North-eastern Canada/Greenland/Iceland/North-western Europe) 1.4% of the population Five year peak mean for 1993/94 to 1997/98 Limosa limosa islandica (Iceland - breeding) 2.4% of the population Five year peak mean for 1993/94 to 1997/98 Pluvialis squatarola (Eastern Atlantic - wintering) 1.7% of the population Five year peak mean for 1993/94 to 1997/98 Tringa totanus (Eastern Atlantic - wintering) 2.2% of the population Five year peak mean for 1993/94 to 1997/98 On passage the area regularly supports: Charadrius hiaticula (Europe/Northern Africa - wintering) 2.6% of the population Five year peak mean for 1993/94 to 1997/98 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 75019 waterfowl (5 year peak mean 1991/92-1995/96) Including: Recurvirostra avosetta , Pluvialis squatarola , Calidris canutus , Calidris alpina alpina , Limosa limosa islandica , Tringa totanus

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	M01		B
H	I01		B
H	G01		I
H	M02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A02		I
H	G03		I
H	D05		I
H	A04		I
H	A06		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

http://publications.naturalengland.org.uk/category/3212324
http://publications.naturalengland.org.uk/category/6490068894089216

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the SPA home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK9012011**

SITENAME **The Swale**

TABLE OF CONTENTS

1. SITE IDENTIFICATION

Back to top

1.1 Type	1.2 Site code
A	UK9012011

1.3 Site name

The Swale

1.4 First Compilation date	1.5 Update date
1982-08	2015-12

1.6 Respondent:

Name/Organisation:	Joint Nature Conservation Committee
Address:	Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:	

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1982-08
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

Back to top

2.1 Site-centre location [decimal degrees]:

Longitude	Latitude
0.839166667	51.36083333

2.2 Area [ha]:

6509.88

2.3 Marine area [%]

44.5

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code	Region Name
UKJ4	Kent

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

Back to top

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A052	Anas crecca			w	2969	2969	i		G	B		C	
B	A051	Anas strepera			w	86	86	i		G	C		C	
B	A675	Branta bernicla bernicla			w	1961	1961	i		G	C		C	
B	A672	Calidris alpina alpina			w	12394	12394	i		G	B		C	
B	A137	Charadrius hiaticula			w	269	269	i		G	C		C	
B	A130	Haematopus ostralegus			w	3731	3731	i	P	G	C		C	
B	A160	Numenius arquata			w	1622	1622	i		G	C		C	
B	A141	Pluvialis squatarola			w	2021	2021	i	P	G	B		C	

B	A162	Tringa totanus			w	1640	1640	i		G	C		C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see reference portal)
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna (optional)

Species					Population in the site				Motivation					
Group	CODE	Scientific Name	S	NP	Size		Unit	Cat.	Species Annex		Other categories			
					Min	Max		C|R|V|P	IV	V	A	B	C	D
B	BBA	Breeding bird assemblage												X
B	WATR	Waterfowl assemblage			65588	65588	i						X	

- **Group:** A = Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P = Plants, R = Reptiles
- **CODE:** for Birds, Annex IV and V species the code as provided in the reference portal should be used in addition to the scientific name
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Unit:** i = individuals, p = pairs or other units according to the standard list of population units and codes in accordance with Article 12 and 17 reporting, (see reference portal)
- **Cat.:** Abundance categories: C = common, R = rare, V = very rare, P = present
- **Motivation categories: IV, V:** Annex Species (Habitats Directive), **A:** National Red List data; **B:** Endemics; **C:** International Conventions; **D:** other reasons

4. SITE DESCRIPTION

Back to top

4.1 General site character

Habitat class	% Cover
N03	5.0
N15	47.0
N06	2.0
N23	6.0
N02	39.0
N05	1.0

Total Habitat Cover	100

Other Site Characteristics

2 Terrestrial: Geomorphology and landscape: coastal,floodplain 3 Marine: Geology: sand,clay,shingle,mud 4 Marine: Geomorphology: estuary,intertidal sediments (including sandflat/mudflat),shingle bar,subtidal sediments (including sandbank/mudbank)

4.2 Quality and importance

ARTICLE 4.2 QUALIFICATION (79/409/EEC) Over winter the area regularly supports: Branta bernicla bernicla (Western Siberia/Western Europe) 0.7% of the population 5 year peak mean 1991/92-1995/96 Calidris alpina alpina (Northern Siberia/Europe/Western Africa) 2.3% of the population in Great Britain 5 year peak mean 1991/92-1995/96 Tringa totanus (Eastern Atlantic - wintering) 0.9% of the population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC): AN INTERNATIONALLY IMPORTANT ASSEMBLAGE OF BIRDS Over winter the area regularly supports: 65588 waterfowl (5 year peak mean 1991/92-1995/96) Including: Branta bernicla bernicla , Anas strepera , Anas crecca , Haematopus ostralegus , Charadrius hiaticula , Pluvialis squatarola , Calidris alpina alpina , Numenius arquata , Tringa totanus

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	M02		B
H	M01		B
H	G01		I
H	F02		I
H	I01		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	A06		I
H	A02		I
H	D05		I
H	A04		I

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://publications.naturalengland.org.uk/category/6490068894089216

http://publications.naturalengland.org.uk/category/3212324
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

Back to top

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	16.1	UK04	100.0		

6. SITE MANAGEMENT

Back to top

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

- [ ] Yes
- [ ] No, but in preparation
- [X] No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the official European Union guidelines for the Standard Data Form. The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippopha□ rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

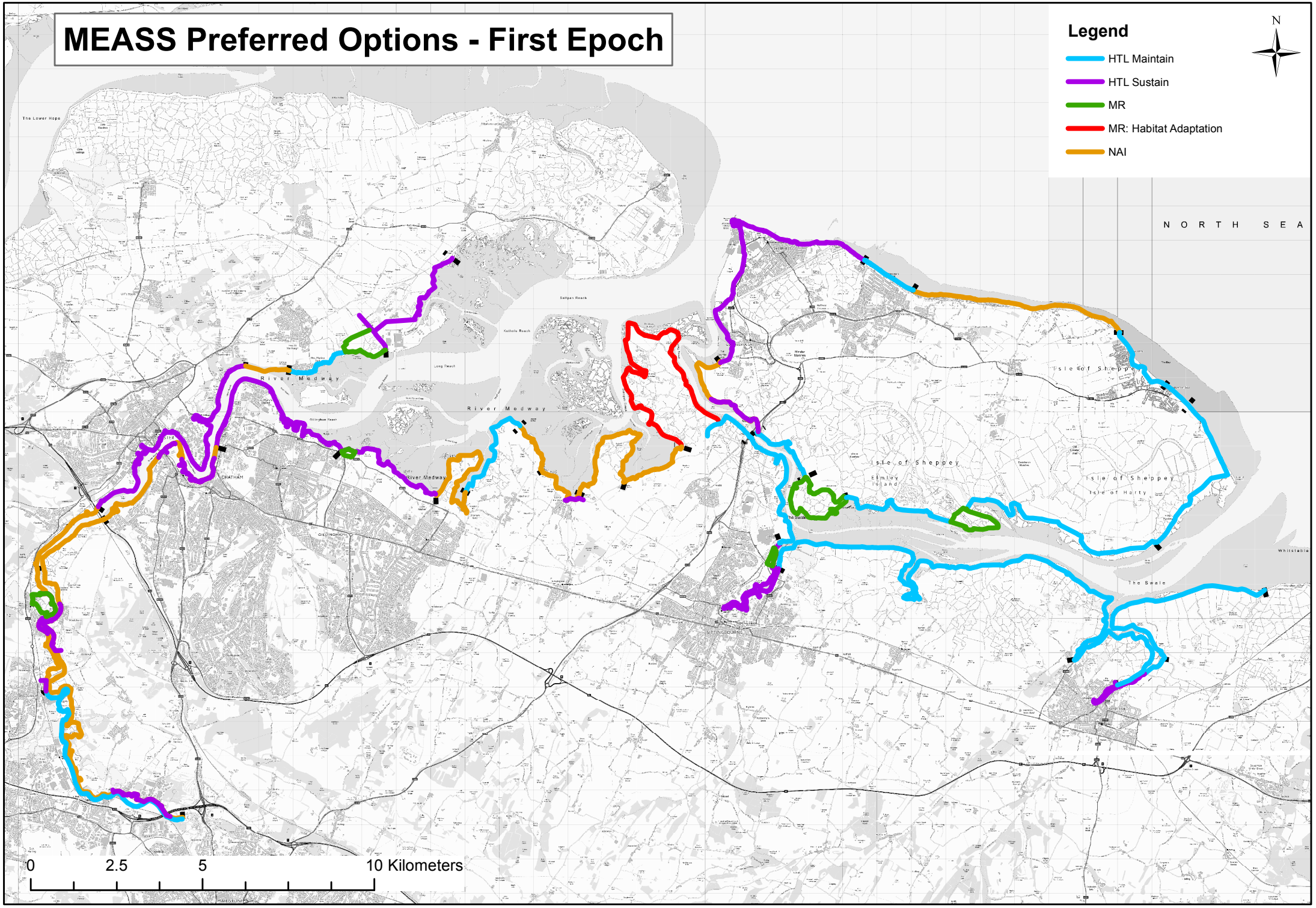
CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic ressources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

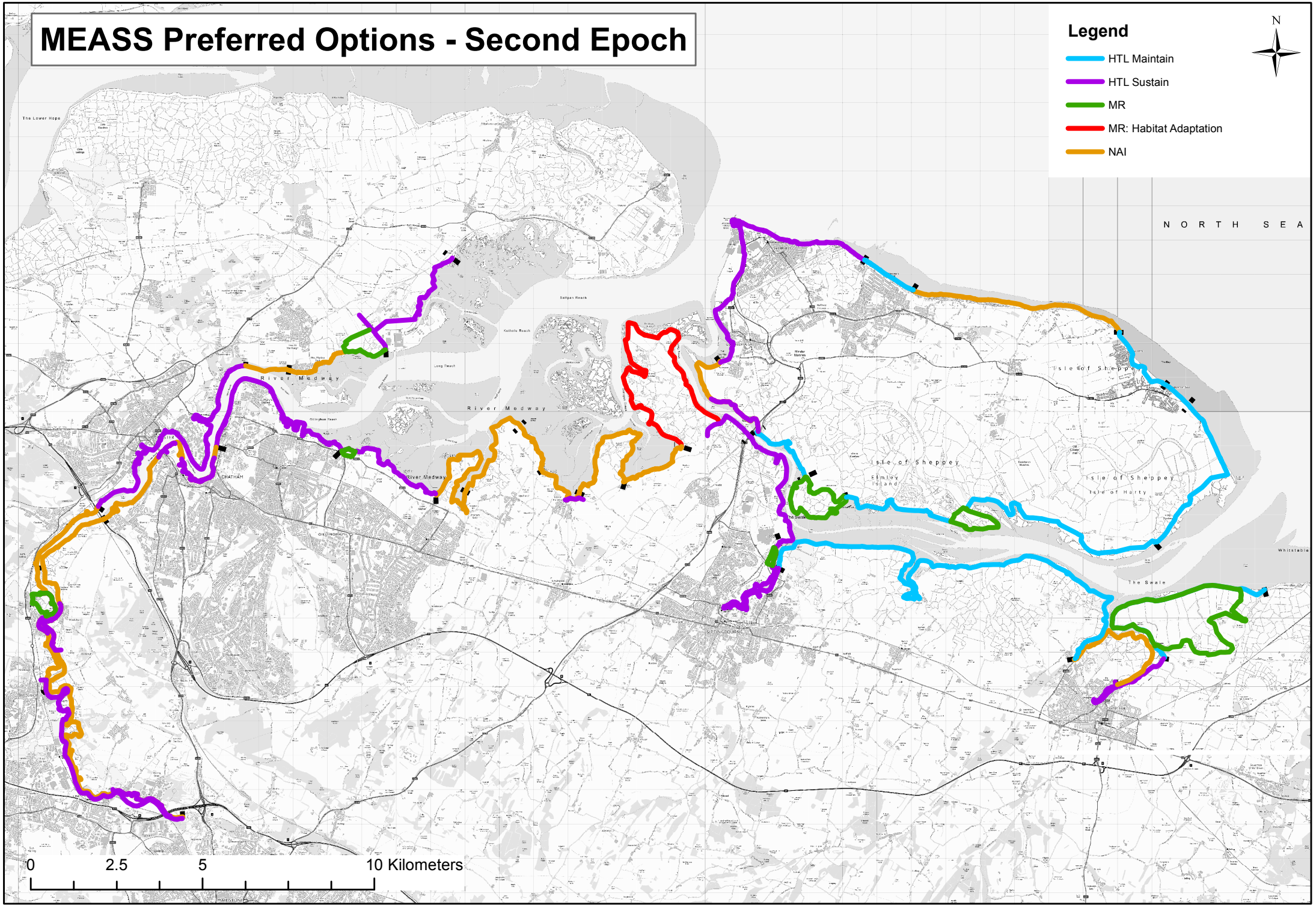
5.1 Designation type codes

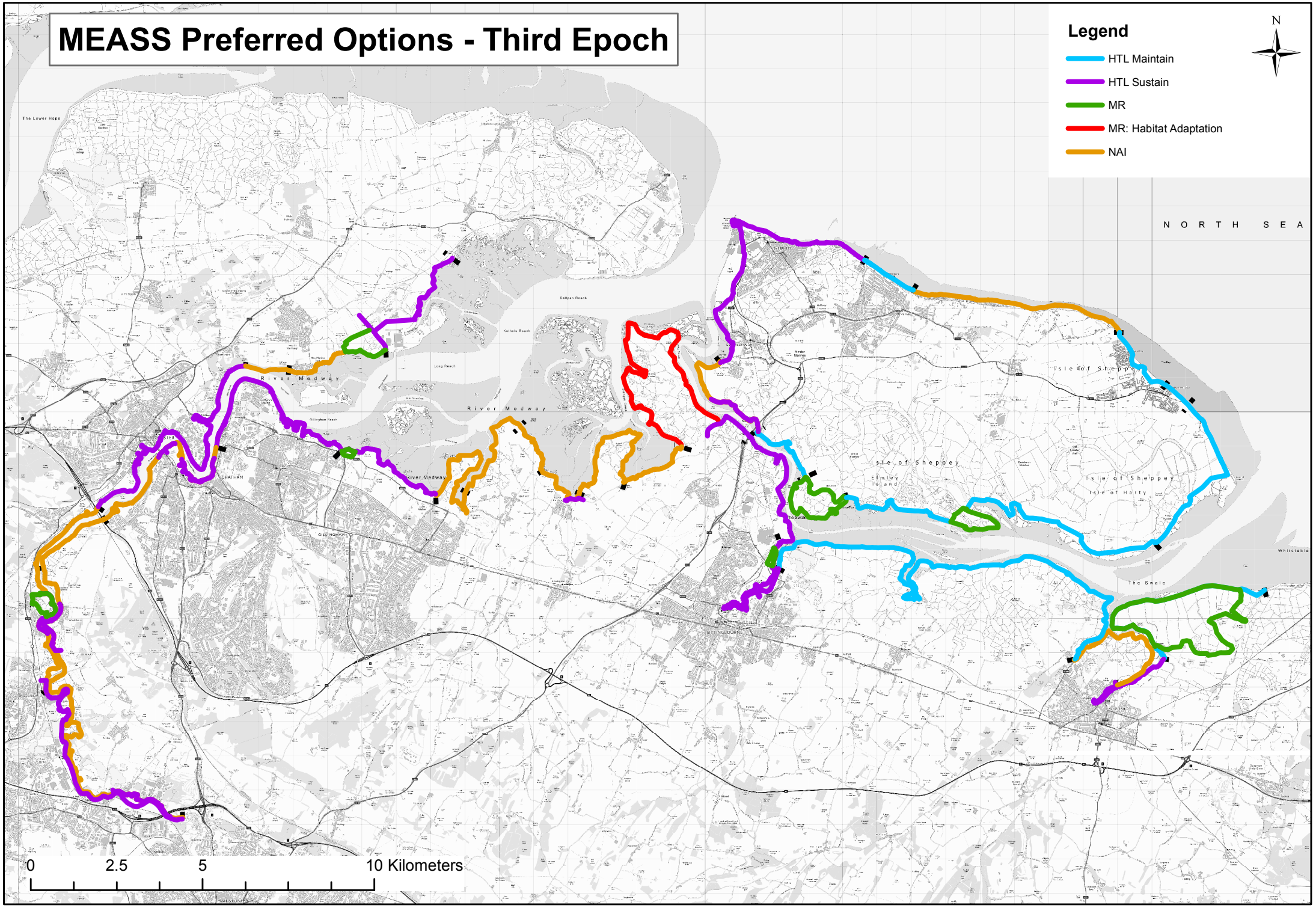
CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

B. Preferred Option Drawings

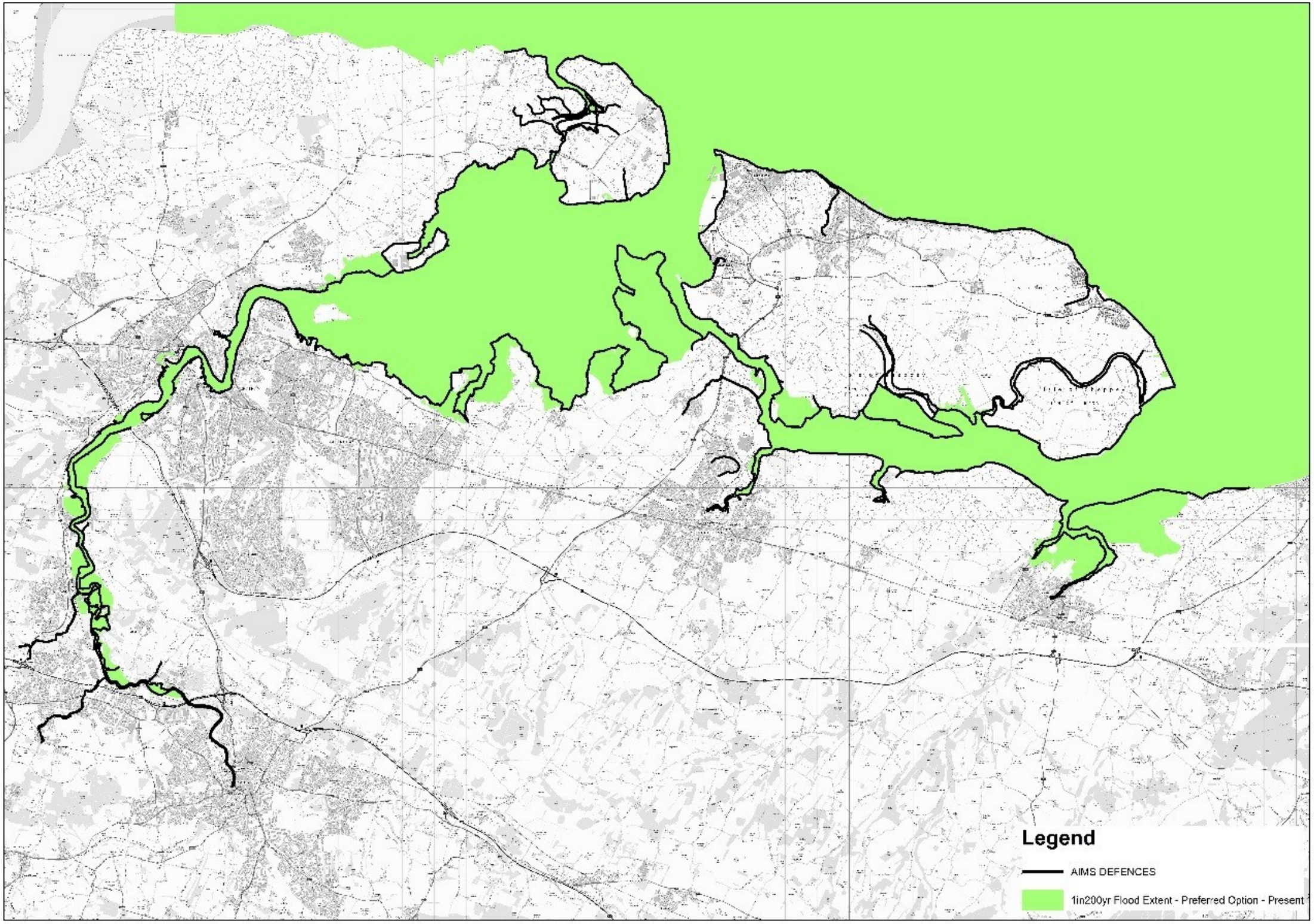

MEASS Preferred Options - First Epoch
Legend
HTL Maintain
HTL Sustain
MR
MR: Habitat Adaptation
NAI
N
NORTH SEA
River Medway
Isle of Sheppey
Elmley Island
Isle of Harty
The Swale
Whitstable
CHATHAM
SITTINGBOURNE
0
2.5
5
10 Kilometers

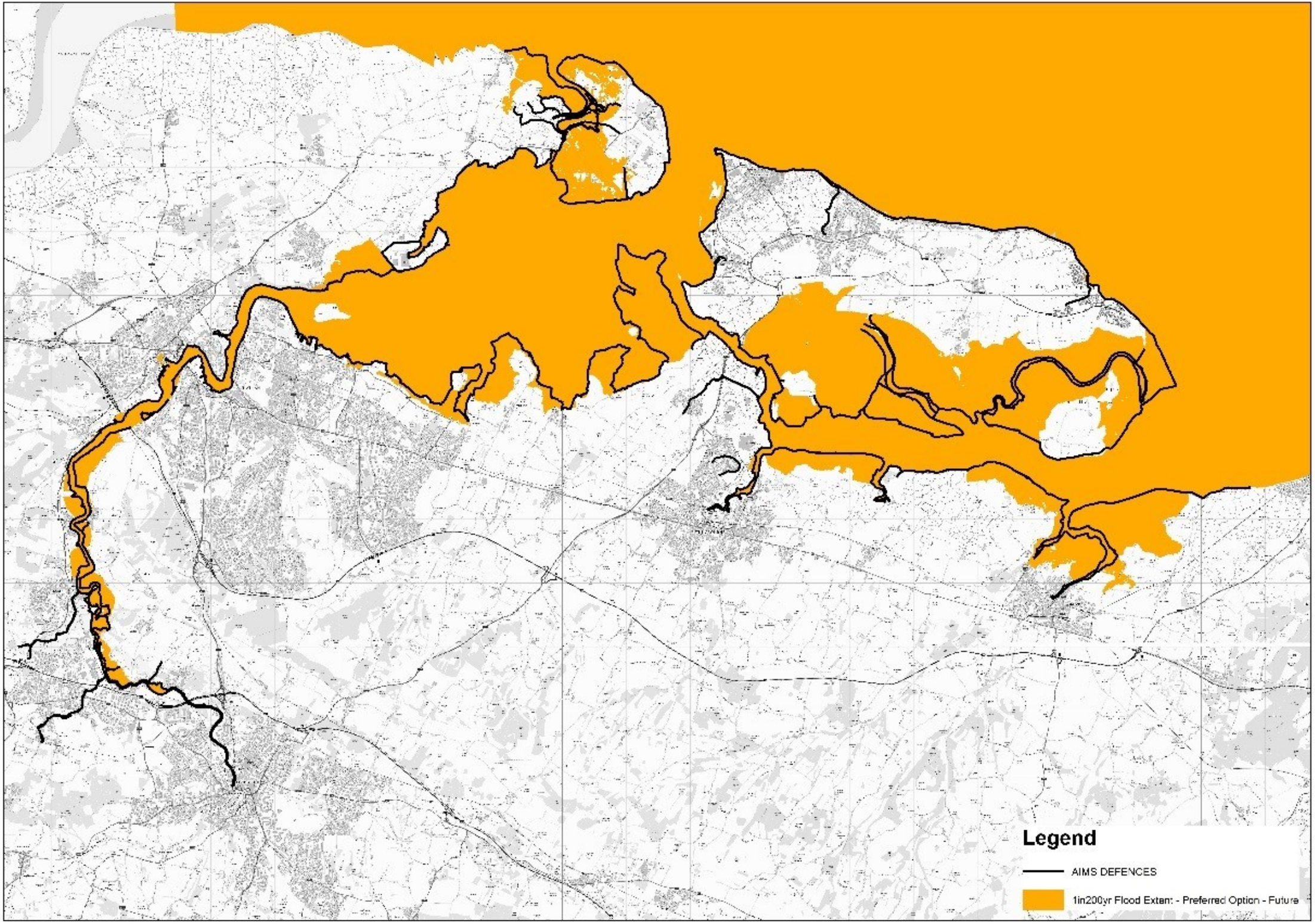
MEASS Preferred Options - Second Epoch



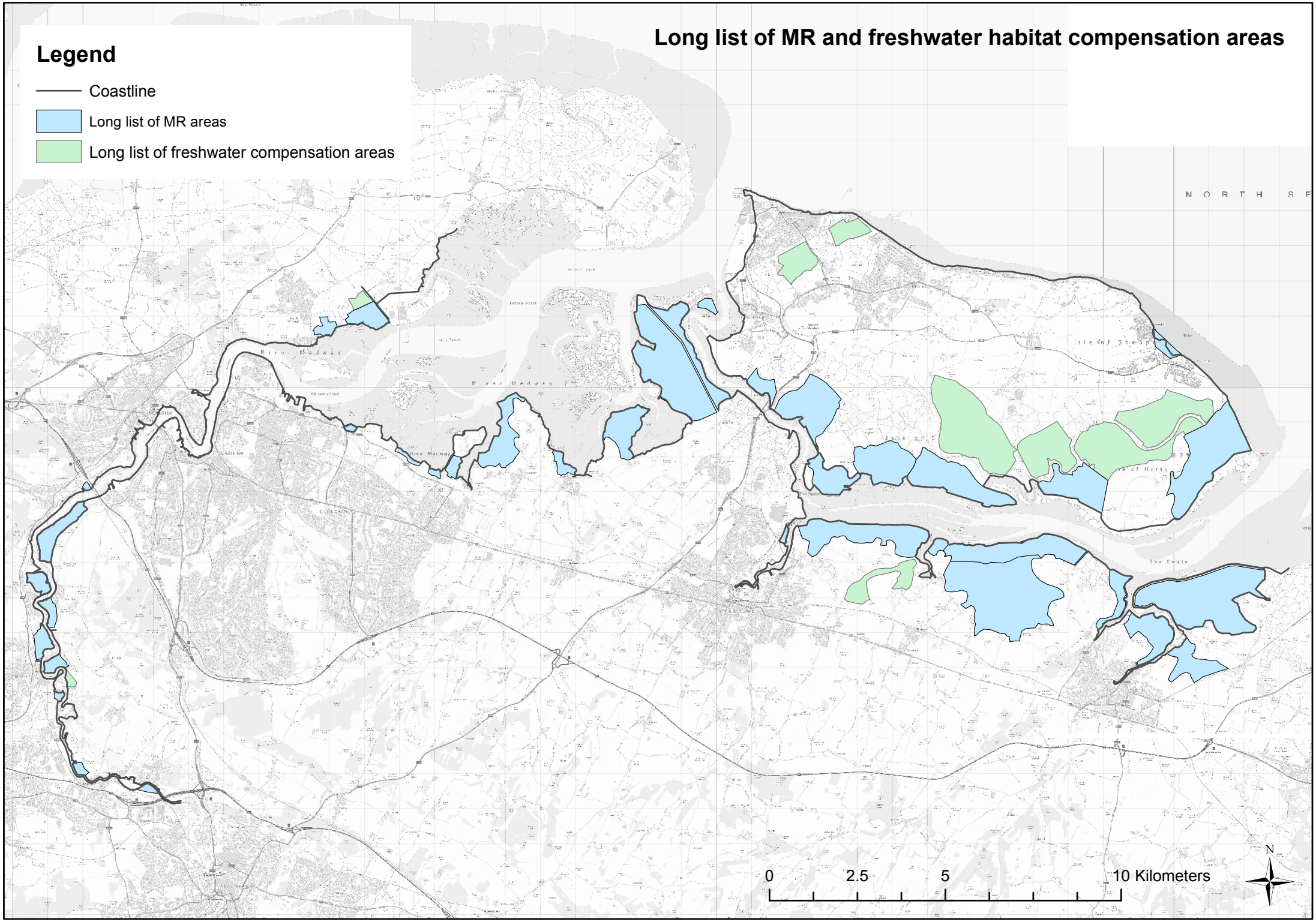

MEASS Preferred Options - Third Epoch
Legend
HTL Maintain
HTL Sustain
MR
MR: Habitat Adaptation
NAI
N
N O R T H S E A
River Medway
Isle of Sheppey
Elmley Island
Isle of Harty
The Swale
Whitstable
CHATHAM
SITTINGBOURNE
0
2.5
5
10 Kilometers

C. Flood Extents Maps

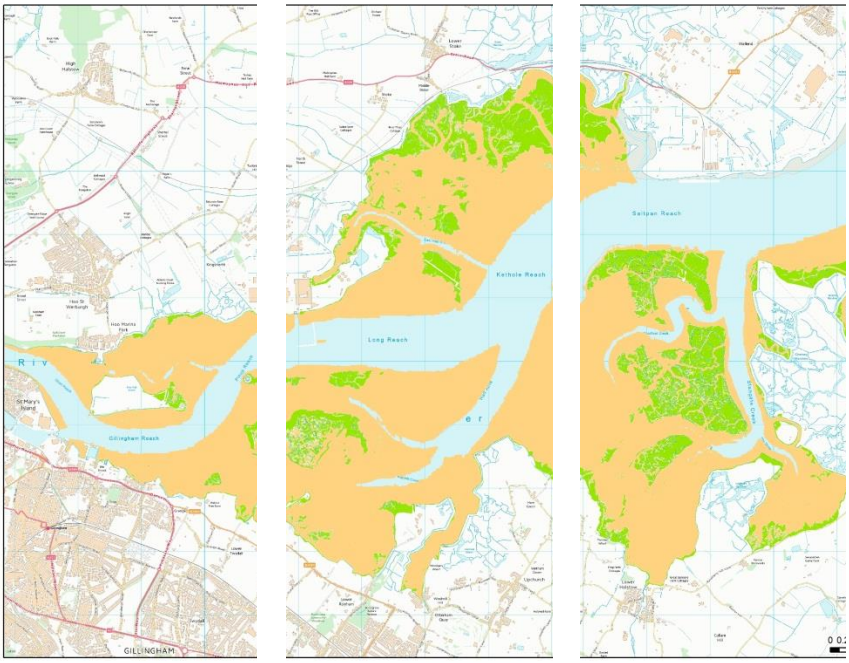

Legend
AIMS DEFENCES
1in200yr Flood Extent - Preferred Option - Present


Legend
AIMS DEFENCES
1in200yr Flood Extent - Preferred Option - Future

D. Potential Sites of Compensatory Freshwater Habitat for Epoch 2


Legend
Coastline
Long list of MR areas
Long list of freshwater compensation areas
Long list of MR and freshwater habitat compensation areas
0
2.5
5
10 Kilometers
N

E. Coastal Processes Study



Habitat Process Study

Coastal Squeeze Section (Technical Note)

February 2016

Environment Agency

Mott MacDonald

Habitat Process Study

Coastal Squeeze Section (Technical Note)

February 2016

Environment Agency

Mott MacDonald, Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom
T +44 (0)20 8774 2000 **F** +44 (0)20 8681 5706 **W** www.mottmac.com

Mott MacDonald

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
P2	1/02/16	S. Costa	S. Hampshire J Fookes	Zoe Hutchison	Second Draft for Discussion
P3	22/02/16	S. Costa	S. Hampshire M Ward	Zoe Hutchison	Third Draft for Discussion

Information class: Standard

Contents

Executive Summary

The overall aim of Medway and Swale Flood Risk Management Strategy (MEASS) is to determine the best economic, social, environmental, and technically appropriate approach to managing flood risk within the strategic area. As part of the Strategy a review of previous studies and literature relating to the current baseline and future evolution of intertidal habitats within the Medway and Swale Estuaries was undertaken; this technical note presented the results of that review. Overall the review indicates that the geomorphological and hydrological changes occurring in the Medway and the Swale estuaries are difficult to predict over a large time scale, with conflicting conclusions regarding the potential for future accretion and erosion within the estuaries.

This technical note also presents the findings of a more recent study undertaken by Mott MacDonald in support of the Strategy. It is proposed that the results of this study be used to define the objectives of the Strategy by predicting how much intertidal habitat could be lost due to coastal squeeze (and therefore how much compensatory habitat might be required).

The GIS based methodology undertaken involved re-assessing the current day baseline and future changes in the extent of both saltmarsh and mudflat habitats within the Strategy area. This considered three scenarios in order to assess the potential variability of habitat change over the next 100years in comparison with the CHAMP figures: Scenario 1 (sea level rise only), Scenario 2 (accretion) and Scenario 3 (erosion).

Whilst the baseline habitat results for this study and the CHaMP are similar, there some differences with the future predictions of habitat change between the two studies, particularly in the short and medium term (0-50 years). However in the long term (100 years) the magnitude of overall intertidal habitat change (mudflat and saltmarsh) is more similar.

Despite undertaking a more simple approach, the study results presented here provide a more recent assessment of coastal squeeze compared to the CHaMP. Therefore it is proposed that the results here are utilised for the Strategy development. The results obtained in this study indicate that the Scenario 1 (sea level rise) predicted habitat change lies between the accretion and erosion results of Scenario 2 and 3. Considering the conflicting conclusions of future changes within the estuaries (and in the previous studies) Scenario 1 provides a precautionary way forward and is recommended for adoption for use within the Strategy. The results presented in this study should be used as an indication of the magnitude and direction of change and not absolute numbers.

Abbreviations

Term	
1D	One Dimensional
Bathymetry	Measurement of depths of large water bodies
CHaMP	Coastal Habitat Management Plan
Defra	Department for Food and Rural Affairs
EA	Environment Agency
EGA	Expert Geomorphological Assessment
GIS	Geographic Information Systems
Ha	Hectares
HAT	Highest Astronomical Tide
JNCC	Joint Nature Conservancy Council
LAT	Lowest Astronomical Tide
LiDAR	Laser remote sensing technology
MEASS	Medway and Swale Flood Risk Management Strategy
MHW	Mean High Water
MHWN	Mean High Water Neaps
MHWS	Mean High Water Springs
MR	Managed Realignment
ODN	Ordnance Data Newlyn
PHI	Priority Habitat Inventory
RHCP	Regional Habitat Creation Programme
SLR	Sea Level Rise
SMP	Shoreline Management Plan
SRES	Special Report on Emission Scenario
UKCP09	Met Office Weather Generator

1 Introduction

1.1 The Strategy

The overall aim of Medway and Swale Flood Risk Management Strategy (MEASS) is to determine the best economic, social, environmental, and technically appropriate approach to managing flood risk within the strategic area. As part of this the Strategy will identify suitable schemes to deliver policies set out within the Medway Estuary and Swale, and the Isle of Grain to South Foreland, Shoreline Management Plans (the SMPs). The Strategy will review and take forward the recommended SMP policies, and where appropriate suggest alternatives. The MEASS study area is presented in Figure 1.1.

Figure 1.1: Medway Estuary and Swale Strategy (MEASS) study area

Source: Mott MacDonald, 2016

As part of the SMPs several studies were undertaken to consider the impact of coastal squeeze on intertidal habitats. This informed the recommendations of the Hold the Line, Managed Realignment and No Active Intervention policies which were adopted in the SMPs. Given that the SMPs were adopted in 2010 there is now a requirement to review these figures (and any other available data since this time) during the Strategy development to inform the flood and erosion risk management options (and schemes) going forward.

1.2 Purpose and structure of this Technical Note

This document aims to provide a review of previous studies which have assessed intertidal coastal processes occurring in the Medway and Swale estuaries, and how these intertidal habitats are predicted to change over the next 100 years.

This report will also present the findings of a more recent study undertaken by Mott MacDonald in support of the Strategy. It is proposed that the results of this study will be used to define the objectives of the Strategy by predicting how much intertidal habitat could be lost due to coastal squeeze (and therefore potential compensation requirements) under a Hold the Line scenario.

The structure of this report is outlined as follows:

Section 1- Background

Section 2- Methodology

Section 3- Results and discussion- baseline habitats

Section 4- Results and discussion- future habitats

Section 5- Conclusion

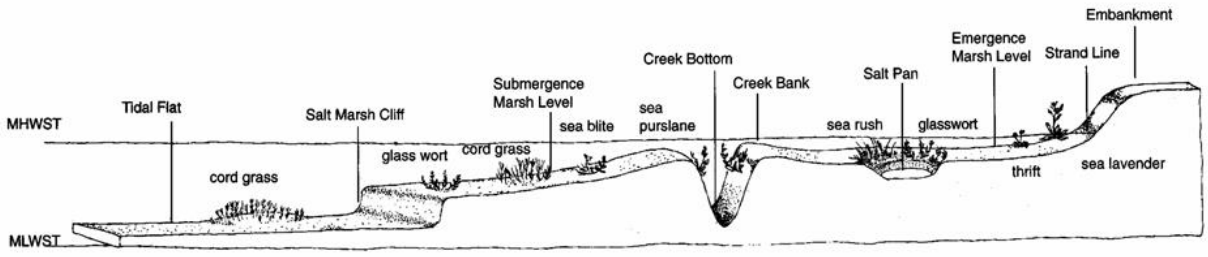
2 Background

2.1 Intertidal habitats within the Strategy area

2.1.1 Saltmarsh and mudflat

Intertidal habitat within the Medway and Swale Estuaries is dominated by mudflats and saltmarshes. Mudflats are sedimentary intertidal habitats created by deposition in low energy coastal environments, particularly estuaries and other sheltered areas. They commonly appear in the natural sequence of habitats between subtidal channels and vegetated saltmarshes between the levels of Mean High Water Neaps (MHWN) and Lowest Astronomical Tide (LAT). Mudflats help to dissipate wave energy, and reduce the risk of saltmarsh erosion. Saltmarshes consist of a vegetated platform generally found between the levels of Highest Astronomical Tide (HAT) and Mean High Water Neaps (MHWN). Saltmarshes consists of a series of creeks which facilitate flow and transport of suspended sediment over the saltmarsh surface during the flood tide.

Figure 2.1: **Profile of a saltmarsh and mudflat (tidal flat) and their main features**



Source: **www.abdn.ac.uk/geospatial**

Erosion of the seaward edge of saltmarsh occurs widely in the high energy locations of the larger estuaries as a result of coastal processes. There is evidence that this process is exacerbated both by the isostatic tilting of Britain towards the south-east, and by climatic change leading to a relative rise in sea level and to increased storminess. Many areas of intertidal habitat are being 'squeezed' between an eroding seaward edge and fixed flood defence walls (JNCC 2016).

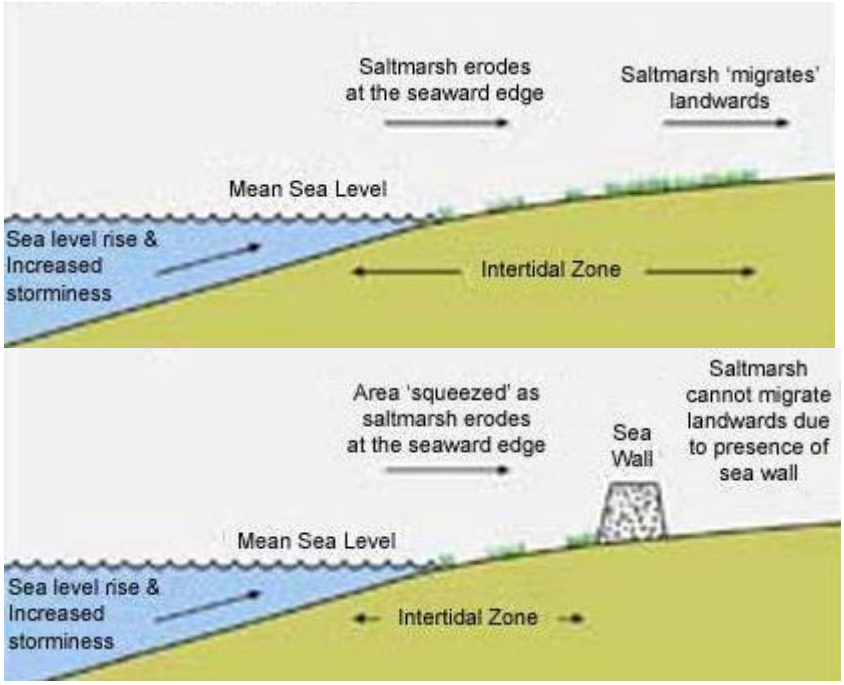
2.1.2 Coastal Squeeze

Rising sea levels and other factors such as the increased frequency of storm events cause the natural migration of intertidal coastal habitats landward. Where land claim or coastal defence has created an artificial margin between land and sea or where the land rises relative to the coastal topography, habitats can become squeezed into a narrowing zone; this is known as coastal squeeze.

Loss of intertidal habitat can be exasperated by changes in local sediment budgets e.g. due to coastal protection works, or by changes in estuary morphology caused by land claim, dredging of shipping

channels and the impacts of flood defence works over the years. However coastal squeeze is the main concern of this technical note. It should be noted that coastal squeeze is a common term used in coastal management although its definition can vary, this may give rise to discrepancies in study results (Pontee 2013).

Figure 2.2: Schematic showing the processes of natural habitat migration (top) and coastal squeeze (bottom).



Source: www3.hants.gov.uk

2.2 Previous studies and data

As stated previously studies and existing datasets describing the Medway and Swale habitat and coastal processes have been reviewed in order to obtain a clear understanding of the estuaries and a prediction of their evolution in the future. A summary of the reviewed studies are presented below.

2.2.1 Medway and Swale Shoreline Management Plan (SMP) – Halcrow, 2010

The Medway and Swale SMP (Halcrow, 2010) is a high level document which provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed areas within the study area. As part of this large scale assessment, the information available related to physical processes and geomorphological evolution of the Medway and Swale Estuary systems (including intertidal habitat).

Appendix C (Baseline Estuary Processes) of the Medway and Swale SMP summarizes historical changes of the estuary and previous works predicting and quantifying the future intertidal habitat and morphological changes expected in the estuaries.

The saltmarsh and mudflats habitat baseline and future surface predictions presented in the SMP are based on Burd's (1992) study "Erosion and Vegetation Change on the Saltmarshes of Essex and North Kent between 1973 and 1988", English Nature (2006) personal communications, the CHaMP (2002) and Kent County Council Kent Biodiversity Action Plan (1997).

During finalisation of the Medway and Swale SMP, Natural England were consulted on the associated Habitats Regulations Assessment (HRA) and confirmed that coastal squeeze was not considered a likely significant effect of the SMP policies, however likely significant effect was concluded in respect of intertidal habitat growth through managed realignment (MR) and associated freshwater habitat displacement (EA 2013).

Compensation provisions were developed following Defra Guidance on Coastal Squeeze which considers compensatory habitat 'secured' if it is suitably programmed and resourced within a Regional Habitat Creation Programme (RHCP). A compensation ratio of 1:1 was agreed for freshwater grazing marsh displaced by managed realignment.

2.2.2 Isle of Grain and South Foreland Shoreline Management Plan (SMP) review – Halcrow, 2010

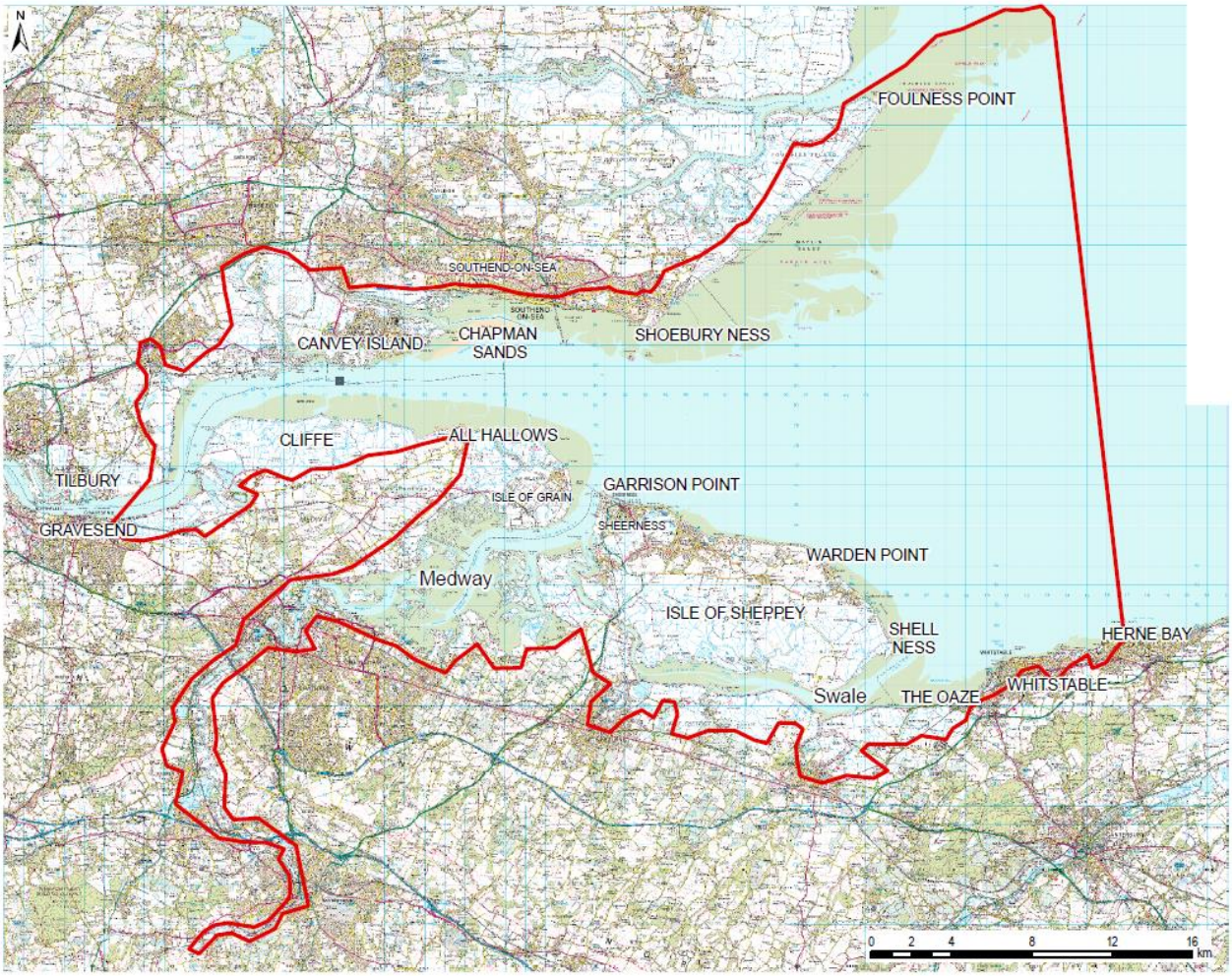
Isle of Grain to South Foreland SMP provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework. The study covers the coastlines of the Isle of Grain and South Foreland.

The SMP coastline is split into the cliff sections in the Isle of Sheppey and low lying areas in the Swale entrance, and therefore, no quantification of saltmarsh and mudflats habitat are reported in this study.

2.2.3 The Greater Thames Coastal Habitat Management Plan (CHaMP) – ABPmer, 2008

The Greater Thames CHaMP study area includes the Thames Estuary upstream as far as Gravesend on the south bank and Tilbury on the north bank. Downstream the study area stretches as far as Herne Bay on the Kent Coast and Foulness Point on the Essex Coast where it meets the southern North Sea. To the south the area also encompasses the Swale and Medway Estuaries. Figure 2.3 presents a map of the area covered by the Greater Thames CHaMP.

Figure 2.3: Greater Thames CHaMP study area



Source: ABPmer, 2008

The Greater Thames CHaMP provides a high level framework to advise the management decisions that may affect sites within the study area designated under the Habitat and Bird Directives and the Ramsar Convention. The CHaMP focuses on habitats and how these may change over time, however it also includes an understanding of the physical processes and morphology of the area may evolve.

Instead of relying on a single method, the Greater Thames CHaMP utilized various techniques, in order to address the large degree of uncertainties related to the limited understanding of the estuaries.

The range of techniques applied to provide the assessment of the current baseline and morphological predictions of the future conditions within the estuaries included:

- **Regime Modelling** – relationships between peak flow and cross-sectional area were used in conjunction with a 1D HD model to assess how changes in mean water level could affect the shape/form of the estuary
- **Tidal Asymmetry** – assessment of how the flood and ebb current speed/water level asymmetry (and periods of slack water) relate to the potential import and export of sediment and how changing the mean sea level impacts this.
- **Historical Trend Analysis** – analysis of historic charts/maps data to determine how estuary has changed in the past to the present day.
- **Sediment Budget** – conceptual understanding of the sediment regime of the estuaries.
- **Shoreline Evolution** – undertaken for areas outside Medway and Swale estuaries (Isle of Sheppey, Mapling Sands and Whitstable to Herne Bay) where wave driven transport has an influence.
- **Expert Geomorphological Assessment** – a consolidation of results from the above work and further literature review.

For the Medway and Swale estuaries, the CHaMP baseline and future habitat predictions were specifically based on physical processes derived from the 1D hydrodynamic model and regime model. The outputs of the hydrodynamic model form the inputs of the regime model. Both models made various assumptions:

- The hydrodynamic model was based on an average tidal cycle and it did not capture all the variability that occurs within the estuary system (storm surges, etc.).
- The regime model assumed that the baseline/existing estuary is in a stable regime state.
- The regime model also assumed a hard surface to constraint the future depth of the estuary.

The Expert Geomorphological Assessment (EGA) undertaken was based on an understanding of the estuaries past evolution as well as the present distribution of existing habitats and their behavioural response to present processes, with implication on the future morphological evolution of the estuary.

Overall due to the large number of uncertainties related to the future evolution of the estuaries, the results presented within the CHaMP should be interpreted as an indication of direction and magnitude of change rather than a precise estimate.

2.2.4 Phase 1 Habitat Survey – Mott MacDonald 2015

The aim of the Phase 1 Habitat Survey is to provide, relatively rapidly, a record of the semi-natural vegetation and wildlife habitat over large areas. These surveys assign a habitat in accordance with the guidance set by the Joint Nature Conservation Committee (JNCC). The habitats are broadly determined on the type of vegetation present.

A Phase 1 Habitat Survey was undertaken in 2015 by Mott MacDonald to map and record both intertidal and freshwater habitats in the Medway and Swale Estuaries.

2.2.5 Natural England's Priority Habitats' Inventory (PHI) – Natural England, 2015

Natural England's Priority Habitats' Inventory (PHI) is a spatial dataset that describes the geographic extent and location of priority habitats in England. These habitats were derived from the UK Biodiversity Action Plan (BAP) priority habitats were those that were identified as being the most threatened and requiring conservation action. The UK BAP describes the biological resources of the UK and provides details plans for the conservation of these resources.

The habitats are defined using several input datasets with different baseline years. The mudflats have been derived from the Environment Agency R&D Technical Report E2A: Biodiversity Key Resources Inventory (2002), Ordnance Survey MasterMap and OS 10k Raster land maps. Saltmarshes are defined according to the Environment Agency's Saltmarsh Extents dataset. This dataset has been interpreted from 10cm per 10cm digital aerial imagery (Environment Agency, 2015).

2.2.6 Summary of previous studies

Table 2.2 presents a summary of the saltmarsh and mudflats baseline habitats obtained from the existing datasets as above.

Table 2.2. Baseline saltmarsh and mudflats habitat from previous studies

Methodology	Saltmarsh Area (ha)	Mudflat Area (ha)
Phase 1 survey (2015)	1192	3927
Priority Habitat Inventory (Natural England, 2015)	1101	5470
Medway and Swale SMP (Halcrow, 2010)	645.5 (Medway) + 384 (Swale) = 1029.5	3362.7 (Medway) + 2042 (Swale) = 5404.7
Greater Thames CHaMP (ABPmer, 2008)	900 (Medway) + 470 (Swale) = 1370	3000 (Medway) + 1900 (Swale) = 4900

It is to be noted that there are some discrepancies between the datasets in terms of habitats delimitations and definitions. For example, some areas in the Upper Medway have been defined as saltmarshes by the PHI dataset; however, Phase 1 habitat surveys have defined these areas as "Swamps". These discrepancies in categorisation may cause some of the differences observed between the surface areas calculated for each habitat.

2.2.7 Additional studies describing the Medway and Swale estuarine processes

A literature review was undertaken in order to obtain additional information regarding the morphology and coastal processes within the Medway and Swale estuaries. From this exercise it was observed that the available studies are showing contradictions of the sediment dynamics in the Medway and Swale estuaries:

- Kirby (2013) describes the Medway as a super-starved sedimentary system that is erosion dominant with fine sediment being discharged seaward. The study also describes the input of sediment to be minor with a potential exchange with the Thames.
- Deloffre et al. (2007) also described Medway estuary as sediment starved system with relatively stable mudflats at different time scales. From a sedimentological point of view, the Medway exhibits two distinct characteristics according to this study: the absence of sands on intertidal mudflats and the reworking of fine particles within the estuary. This last feature is a consequence of the absence of significant external sediment supply. While some mudflats are slowly accreting, erosion processes dominate. The study quote measured accretion rates (approx. 4mm/yrs.) form Cundy *et al.* (2007) study.
- According to Cundy *et al.* (2007), the Medway estuary is undergoing erosion and general loss of salt marsh areas. Suspended sediment fluxes are of the order of 0.03 g/m^3/s, and the marsh system has low rates of vertical accretion (sediment accumulation rates are ca. 3 to 4mm/y). Current velocity data from this study (at a location of upper mudflat and marsh around Barlett Creek) indicate higher velocities on the ebb tide than occur on the flood tide, which may be sufficient to remobilise sediments deposited on the previous tide and force a net removal of material from the marshes. The Cundy *et al.* (2007) study indicates that the Medway is dominated by fine sediments that are reworked within the estuary.
- On the other hand, Halcrow (2010) describe both Medway and Swale as undergoing net accretion with reference to previous studies (IECS, 1993; MESO, 2001, Dalton & Cottle 2002; and Halcrow, 2002).
- The Medway and Swale SMP (Halcrow, 2010), describes the estuaries as a weak sink for fine sediment and that the volumes of sediment being deposited onto the saltmarshes is greater than that being lost in the erosion of the saltmarsh cliffs and mudflats. The study suggests that the most significant supply of sediment is from the Greater Thames Embayment.

3 Methodology

3.1 Overall approach and methodology

A GIS based approach has been used to assess the present day habitat baseline and potential future coastal habitats under different scenarios. The details of the methodology used to determine a current baseline for the Strategy, including key assumptions are presented further below.

3.1.1 Present day baseline habitats

Present day baseline extent of mudflats and saltmarshes in the Strategy area were defined according to their distribution relative to the tide level (Table 3.1). Water levels (from Highest Astronomical Tide (HAT) to Lowest Astronomical Tide (LAT) were assessed by interpolating the different tide levels across the estuary (Table 3.2).

Table 3.1. Coastal habitat definition

Coastal Habitat	Criteria for habitat occurrence based on tidal level and elevation
Saltmarsh	Highest Astronomical Tide (HAT) - Mean High Water Neaps (MHWN)
Mudflats	Mean High Water Neaps (MHWN) - Lowest Astronomical Tide (LAT)
Standing water	< Lowest Astronomical Tide (LAT)

Table 3.2 Summary of tidal levels (mODN) in the Medway and Swale Estuaries

Medway	MHWS	MHWN	MLWN	MLWS
Sheerness	2.9	1.8	-1.4	-2.3
Bee Ness	3.2	2	-1.3	-2.2
Bartlett Creek	3.1	1.9	No data	No data
Chatham	3.3	2	-1.4	-2.4
Rochester (Strood Pier)	3.26	2.16	-1.44	-2.44
Wouldham	3.49	2.29	-1.61	-1.81
New Hythe	3.55	2.35	-0.35	-0.35
Allington Lock	3.58	2.38	0.08	0.08
Swale				
Chetney Marshes (using slope)	3.0	1.8	-1.30	-2.30
Grovehurst Jetty	2.9	1.8	-1.4	-2.4
Faversham	2.8	1.7	No data	No data

Source: Admiralty Total Tide, 2015

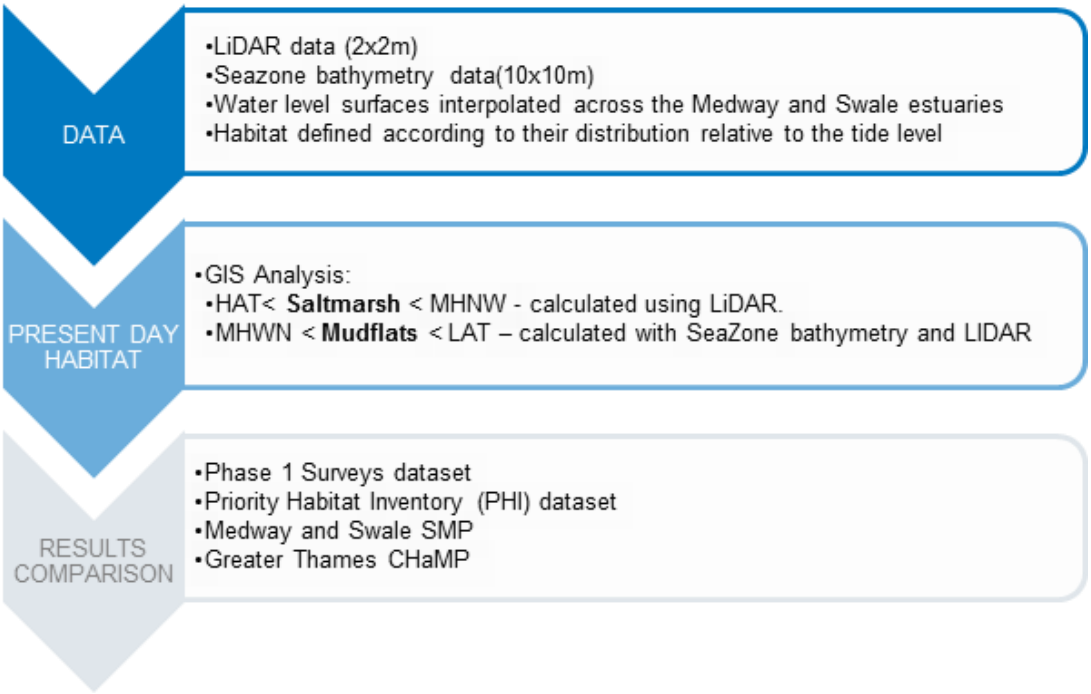
Using a combination of LiDAR (2012) and bathymetry data together with the corresponding water level surfaces the different coastal habitats were calculated:

- Saltmarsh area(ha) was calculated using LiDAR (2012) data with a resolution of 2x2m
- Mudflat area (ha) was calculated using the bathymetry (as utilised in the Strategy), which combines data from Seazone (TruDepth Grids, variable dates) below a level of -1.55mODN and LiDAR (2012) data above this value with a resolution of 10x10m.

Google Earth images were also used to validate the baseline model; especially in areas were the datasets were showing discrepancies. A summary of the methodology is outlined in Figure 3.1 below. This methodology based on elevation assumed that:

- Each habitat type is determined by the appropriate elevation; and
- The habitats are constrained by the defence lines (i.e. defences will be maintained over the 100 years).

Figure 3.1: Baseline saltmarsh and mudflats schematic methodology



Source: Mott MacDonald, 2016

3.1.2 Future habitats

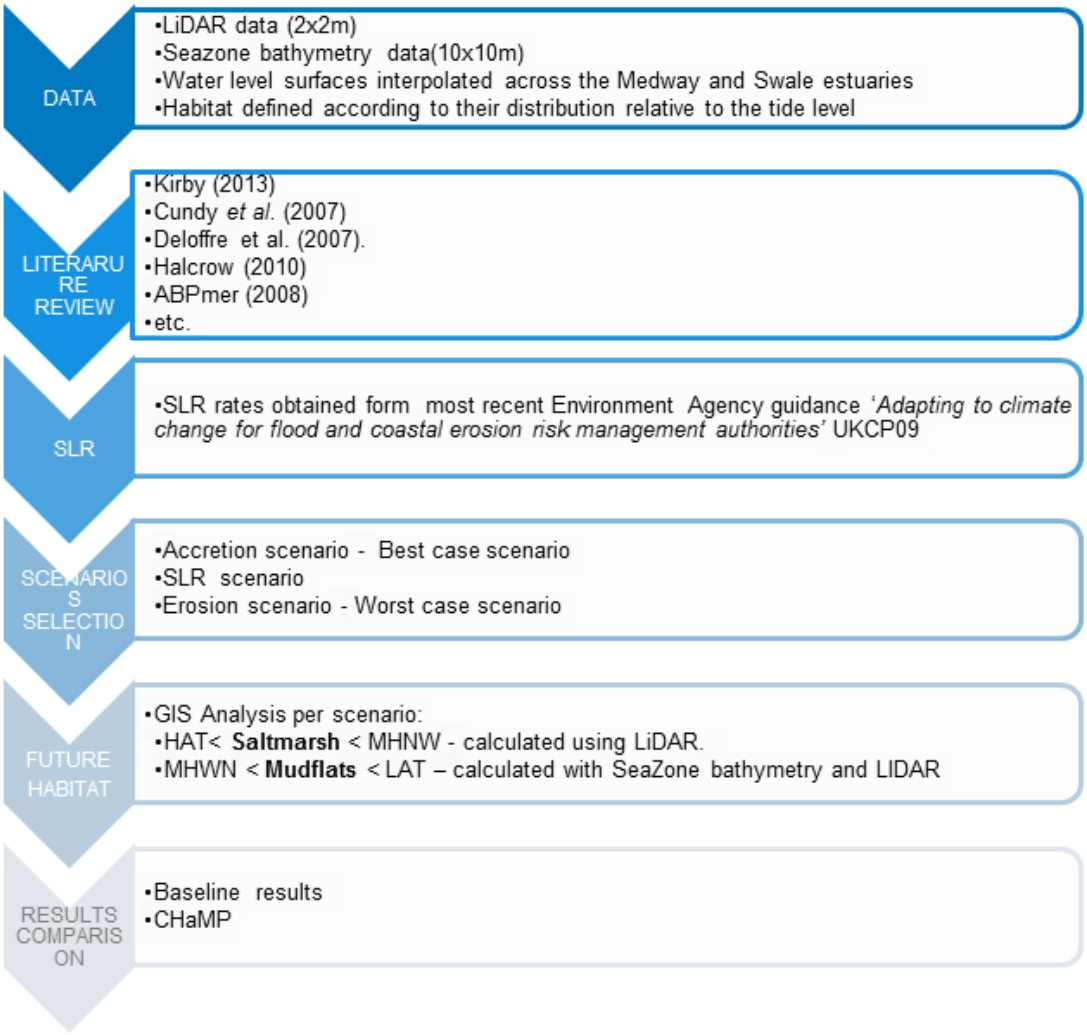
Once the present day baseline habitat was calculated, the changes in the distribution and extent of saltmarsh and mudflats across the estuaries were calculated for the next 20, 50 and 100 year time periods. Since the existing literature provides contradictory predictions of potential future changes within the estuary (Section 1), three scenarios were considered in order to undertake a range of assessments and provide sensitivity analysis on potential magnitude of changes:

- **Scenario 1: Sea level rise scenario** – with sea level rise but assuming no accretion or erosion of the estuaries over the next 100 years.
- **Scenario 2: Accretion scenario** – a 3mm/year accretion rate was applied over the whole study area over the next 100 years. The accretion rate was selected from the reported measurements by Cundy *et al.* (2007) and Deloffre et al. (2007).
- **Scenario 3: Erosion scenario** - A 3mm/year erosion rate was applied over the whole study area over next 100 years. Since no suggested erosion rates were obtained from the literature, a 3mm/year

assumption was deemed an appropriate measurement. This gives a precautionary estimate to balance against the accretion scenario.

A detailed description of the assumption and limitations of the above scenarios is presented in the following sections. Figure 3.2 presents a schematic diagram of the methodology undertaken to assess future habitat changes.

Figure 3.2: Predicted future saltmarsh and mudflats schematic methodology



Source: Mott MacDonald, 2016

3.1.3 Scenario 1: Sea level rise scenario

Sea level rise rates were obtained in accordance with the most recent Environment Agency guidance '*Adapting to climate change for flood and coastal erosion risk management authorities'* UKCP09. The

medium SRES (Special Report on Emission Scenario) scenario data (95th percentile) is recommended in the guidance and therefore was selected for Sheerness. Table 3.3 presents the estimated sea level rise for Sheerness.

Table 3.3: Sea level rise estimates for Sheerness from UKCP09 (medium scenario) data

Year	Sea level rise compared to current day (m)
Current day	0
2035	0.12
2065	0.325
2115	0.746

Source: UKCP, 2015

The sea level rise (SLR) rates were applied to the present day habitat and following the previous methodology, using a combination of LiDAR (2012) and bathymetry data together with the corresponding water level surfaces including SLR, the different coastal habitats were calculated for 2035, 2065 and 2115 epochs.

The method assumed that:

- The morphology of the estuary is stable and no accretion/erosion of the bed will take place over the period of analysis;
- Each habitat type will form where there is the right elevation for them to do so;
- The habitats are constrained by the defence lines;
- The defence line will not change over the 100 year time period of the analysis; and
- There will be no changes to the management practices of the estuary over the period of analysis.

3.1.4 Scenario 2: Accretion scenario

On top of the sea level rise expected for over the next 100 years according to Table 4, a scenario considering accretion rates over both estuaries was developed.

The method assumed that:

- A constant accretion rate of 3mm/year selected according to the measured data form Deloffre *et al.* (2007) and Cundy *et al.* (2007). The accretion was applied over the whole area of both estuaries.
- The accretion rate will be stable over a 100 year period of analysis. There are large uncertainties in the prediction of changes in accretion rates over large period of time; therefore, for the purpose of this analysis, the rate of accretion was kept constant over the time.
- No erosion of the estuary is expected.
- Each habitat type will form where there is the right elevation for them to do so.
- The habitats are constrained by the defence lines.
- The defence line will not change over the 100 year time period of the analysis.
- There will be no changes to the management practices of the estuary over the period of analysis.

3.1.5 Scenario 3: Erosion scenario

On top of the sea level rise expected for over the next 100 years according to Table 4, a scenario considering erosion rates over both estuaries was developed.

The method assumed that:

- A constant erosion rate of 3mm/year was selected in order to take a precautionary approach based on the literature. The erosion was applied over the whole area of both estuaries.
- The erosion rate will be constant over a 100 year period of analysis, similar to the accretion rate scenario.
- No accretion of the estuary is expected.
- Each habitat type will form where there is the right elevation for them to do so.
- The habitats are constrained by the defence lines.
- The defence line will not change over the 100 year time period of the analysis.
- There will be no changes to the management practices of the estuary over the period of analysis

3.2 Uncertainties

It is important to recognise that the prediction of the present day habitat used has a baseline was purely based on bed elevation and habitat distribution according to the tidal frame. Uncertainties are related to the input data (LiDAR resolution of 2x2m, bathymetry resolution of 10x10m, accuracy of the interpolated water levels surfaces across the estuaries, etc.) together with the assumption that the habitat are located where expected, in terms of elevation, must be noted.

In addition, there is a great uncertainty on the prediction of habitat over a large scale of time. The changes in the habitat are based on the baseline definition, interpretation of process, SLR rates and the al the previously detailed assumptions.

The results presented are only an indication of the potential present day habitat and the potential magnitude of habitat change across the Medway and Swale estuaries, and not absolute values. Habitat quality is determined by various local factors including freshwater flows over intertidal features and quality of adjacent habitats.

4 Results and Discussion- present day habitat

4.1 Present day saltmarsh

4.1.1 Results

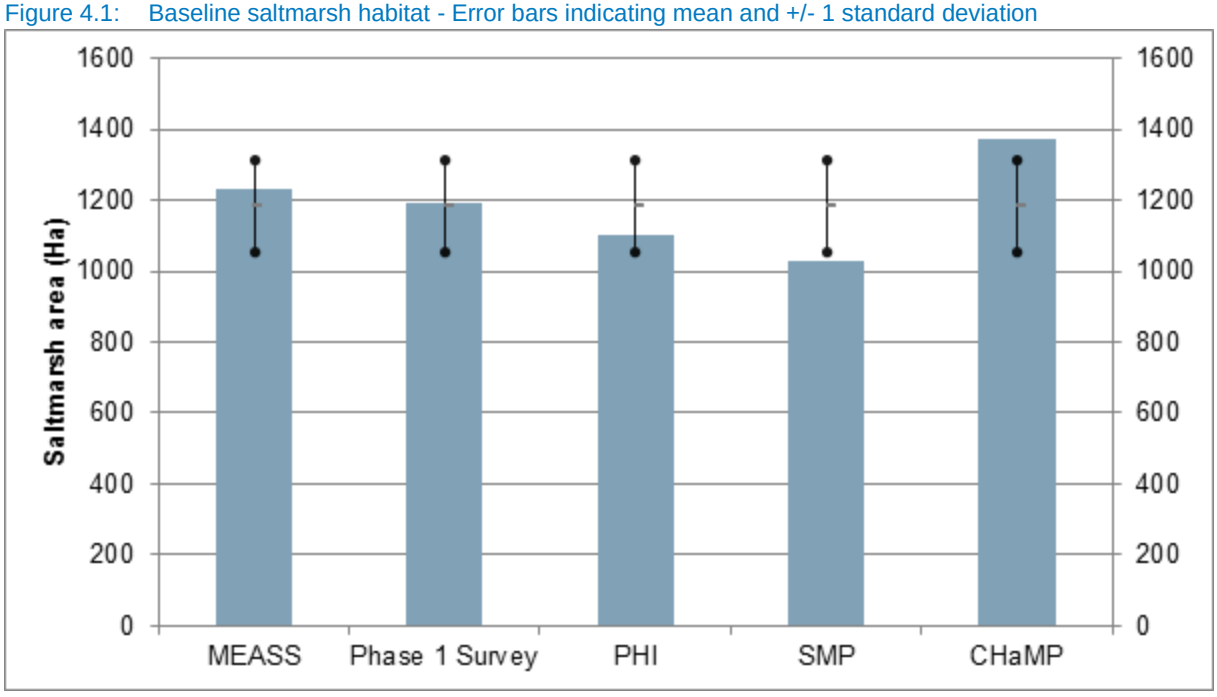
Table 4.1 and Figure 4.1 present the baseline saltmarsh habitat derived with the above defined methodology in comparison to the habitat defined according to the Phase 1 survey, the Greater Thames CHaMP, the Medway and Swale SMP and the PHI datasets. Overall the current baseline habitat area from all the studies appears to be of a similar magnitude; however there are some variations which may be explained by differences in habitat definitions and survey techniques (Section 4.1.2).

Table 4.1. Baseline saltmarsh habitat

Methodology	Saltmarsh Area (ha)
Baseline model based on elevation	**1231**
Phase 1 survey (Mott MacDonald, 2015)	1192
Priority Habitat Inventory (Natural England, 2015)	1101
Medway and Swale SMP (Halcrow, 2010)	645.5 (Medway) + 384 (Swale) = 1029.5
Greater Thames CHaMP (ABPmer, 2008)	900 (Medway) + 470 (Swale) = 1370

Source: Mott MacDonald, 2016

Figure 4.1: Baseline saltmarsh habitat - Error bars indicating mean and +/- 1 standard deviation



Source: Mott MacDonald, 2016

4.1.2 Discussion

There are possible explanations for the observed differences in the results from the various studies detailed above. These could be accounted for by:

Definition of habitats

Saltmarsh data, in PHI datasets, is obtained from The Environment Agency's Saltmarsh Extents dataset. The confidence of this data in the area is mainly defined as "Medium", indicating an inventory less than 10 years old without National Vegetation Classification data (Natural England, 2015)

The saltmarsh extent reported in SMP (Halcrow, 2010) is based on Burd (1992) study in the Medway estuary. In the Swale estuary, the SMP saltmarsh numbers are from English Nature (2006) personal communications.

Methodology undertaken

The Burd (1992) study was based on two sets of aerial photographs to allow comparison:

- 1973 photographs mapped into Ordnance Survey maps and validated by ground-truth surveys and soil and flora sampling.
- 1988 survey in which vegetation boundaries were drawn over a new set of aerial photographs
- Field surveys were also undertaken in order to visit as much saltmarsh areas as possible. For most of the unvisited areas "best guess" vegetation maps were produced based on the experience gained in the rest of the completed surveys.

In the Greater Thames CHaMP, the saltmarsh habitat was obtained based on physical parameters derived from a hydrodynamic 1D model and morphological (regime) models. In the study, the extent of the habitat was also calculated using GIS format based on a series of rules relating the habitat type to the environmental variables of the site.

Temporal Differences

The date of the baseline data of the datasets is different (however it has been assumed that no significant habitat changes have taken place over this period of time).

In spite of the differences between the datasets, a general agreement of the saltmarsh spatial distribution in the Estuary can be observed between the methodology derived in this study and the previously derived datasets, adding confidence to the currently proposed methodology.

Appendix A presents the spatial distribution of the saltmarsh in both the Medway and Swale estuaries.

4.2 Present day Mudflats

4.2.1 Results

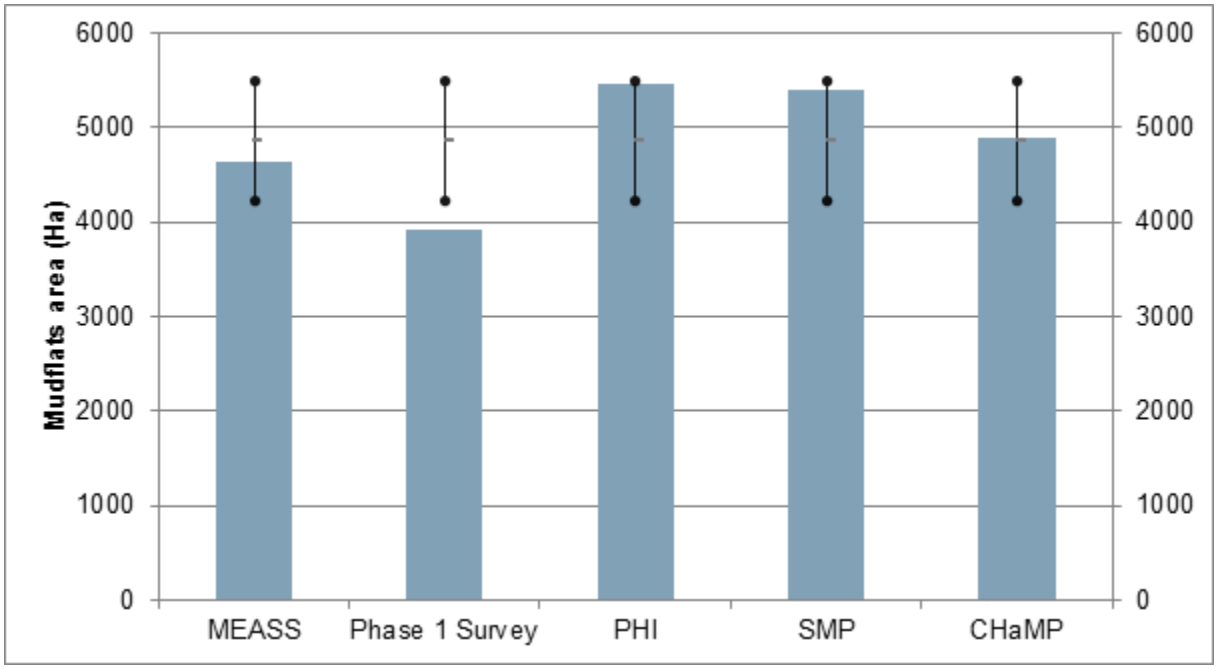
Table 4.2 and Figure 4.2 present the baseline mudflat habitat derived using the defined elevation methodology used for this study. The table also presents the habitat defined according to the Phase 1 surveys, the PHI dataset, the Greater Thames CHaMP and the reported by the SMP (Halcrow, 2010). The results presented indicate that between 4000ha and 5500ha of mudflats currently exist in the Swale and Medway estuaries. Using the methodology derived in this study the area of mudflats obtained is within the range of the other datasets.

Table 4.2 Baseline mudflats habitat

Methodology	Mudflat Area (ha)
Baseline model based on elevation	**4649**
Phase 1 survey (Mott MacDonald, 2015)	3927
Priority Habitat Inventory (Natural England, 2015)	5470
Medway ad Swale SMP (Halcrow, 2010)	3362.7 (Medway) + 2042 (Swale) = 5404.7
Greater Thames CHaMP (ABPmer, 2008)	3000 (Medway) + 1900 (Swale) = 4900

Source: Mott MacDonald, 2016

Figure 4.2: Baseline mudflat habitat - Error bars indicating mean and +/- 1 standard deviation



Source: Mott MacDonald, 2016

4.2.2 Discussion

The differences observed are again likely to be related to definition of habitats and the methodologies undertaken (as for the saltmarsh above). These are explained below.

Definition of habitats

The smaller surface area of mudflats across the Medway and Swale estuary was obtained with Phase 1 surveys data. Further analysis of this dataset was undertaken in order to compare it to the results based on tide levels and estuaries elevations. Several additional habitats are considered in the Phase 1 surveys dataset, corresponding to intertidal shingles, unknown habitat and running water. The methodology based on tide and elevation is not able to differentiate these additional habitats, and therefore, the differences observed between the results.

PHI mudflats data, on the other hand, is based on the Environment Agency R&D Technical Report E2A: Biodiversity Key Resources Inventory (2002), Ordnance Survey MasterMap and OS 10k Raster land maps. Since this data is derived for the entire UK, the resolution is larger, and probably no survey has been undertaken to define the habitat; therefore, the results obtained should carefully considered.

In the Medway and Swale SMP, mudflats figures are based on the CHaMP (2002), which takes figures from KCC (1997) in the Swale estuary. In the Medway estuary, the area of mudflats is taken from Burd (1992).

KCC (1997) figures are based on BAP habitat definitions. The report also presents mudflats figures for Medway estuary (2,803ha) which are smaller than the reported by Burd (1992) and used in the SMP by Halcrow (2010).

Methodology undertaken

In the Greater Thames CHaMP, the mudflat habitat is calculated similar to the saltmarsh, using 1D hydrodynamic model and regime models.

Appendix A presents the spatial distribution of the mudflats in both the Medway and Swale estuary derived along this study.

5 Results and Discussion – future habitats

5.1 Results

The results for the changes in the saltmarsh and mudflat habitat over a 100 year time are presented according to the three scenarios adopted:

- **Scenario 1:** Sea level rise scenario;
- **Scenario 2**: Accretion scenario; and
- **Scenario 3**: Erosion scenario

5.1.1 Scenario 1: Sea level rise scenario

Table 5.1 presents the results obtained considering the sea level rise medium emission rates from the UKCP09 guidance for Sheerness. The table indicates the potential total change of saltmarsh and mudflats habitat predicted for 2035, 2065 and 2115. Please note that all results indicate the most likely direction of change and scale and not absolute numbers.

Table 5.1 Predicted potential saltmarsh and mudflats habitat

Habitat	Area (ha)			
	2015	2035	2065	2115
Saltmarsh	1231	1153	1013	705
Mudflats	4642	4661	4712	4872

Source: Mott MacDonald, 2016

Table 5.2 provides a summary of the predicted change in the extent of the saltmarsh and mudflats areas over the next 100 years. From the table it can be noticed that the saltmarsh habitat is significantly decreasing over the period of analysis (43% decreased in area between 2015 and 2115).

Table 5.2. Predicted potential change of saltmarsh and mudflats habitat relative to the 2015 baseline. Negative numbers indicate a loss.

Habitat	% of change compared to the baseline		
	2035	2065	2115
Saltmarsh	-6	-18	-43
Mudflat	0	2	5

Source: Mott MacDonald, 2016

5.1.2 Scenario 2: Accretion scenario

Table 5.3 presents the result obtained considering a constant accretion rate of 3mm/year (Deloffre *et al.*, 2007) together with the expected SLR over the period of the analysis. From the table, it can be noticed, that the extent of saltmarsh is still decreasing over 100 years period, even if the whole estuary is accreting. This is related to the accretion rates of the estuary being smaller than the rate of sea level rise (approx.

7mm/year). Small changes in the extent of mudflats can be observed over 100 year period (3% overall gain).

Table 5.3. Predicted potential saltmarsh and mudflats habitat considering a coastal accretion rate of 3mm/year

Habitat	Area (ha)			
	2015	2035	2065	2115
Saltmarsh	1231	1204	1126	942
Mudflats	4642	4652	4680	4762

Source: Mott MacDonald, 2016

Table 5.4 provides a summary of the predicted change in the extent of the saltmarsh and mudflats areas over the next 100 years considering the constant accretion rate. From the table it can be noticed that the accretion rate is slowing the saltmarsh habitat decrease, from 43% loss (Table 5.3) for Scenario 1 to 23% loss for Scenario 2. However, the coastal squeeze of the saltmarsh is still predicted.

Table 5.4 Predicted potential change of saltmarsh and mudflats habitat relative to the 2015 baseline considering a constant accretion rate. Negative numbers indicate a loss.

Habitat	% of change compared to the baseline		
	2035	2065	2115
Saltmarsh	-2	-9	-23
Mudflats	0	1	3

Source: Mott MacDonald, 2016

5.1.3 Scenario 3: Erosion scenario

Table 5.5 presents the results obtained considering a constant erosion rate of 3mm/year together with the expected SLR over the period of the analysis. From the table, it can be noticed, that the extent of saltmarsh considerably decreases over 100 years period. The effect of the sea level rise combined with the erosion of the estuary will cause the loss of most of the saltmarshes in the estuary (77% is predicted to disappear, according to Table 5.6).

Table 5.5. Predicted potential saltmarsh and mudflats habitat considering a coastal erosion rate of 3mm/year

Habitat	Area (ha)			
	2015	2035	2065	2115
Saltmarsh	1231	1123	922	286
Mudflats	4642	4682	4772	5305

Source: Mott MacDonald, 2016

Table 5.6 provides a summary of the predicted change in the extent of the saltmarsh and mudflats areas over the next 100 years considering the assumed constant erosion rate.

Table 5.6 Predicted potential change of saltmarsh and mudflats habitat relative to the 2015 baseline considering a constant erosion rate. Negative numbers indicate a loss.

	% of change compared to the baseline		
Habitat	2035	2065	2115
Saltmarsh	-9	-25	-77
Mudflats	1	3	14

Source: Mott MacDonald, 2016

5.2 Saltmarsh results comparison

The saltmarsh results of the three selected scenarios are presented in Table 14 in order to allow comparison, both in term of surface areas and change in time.

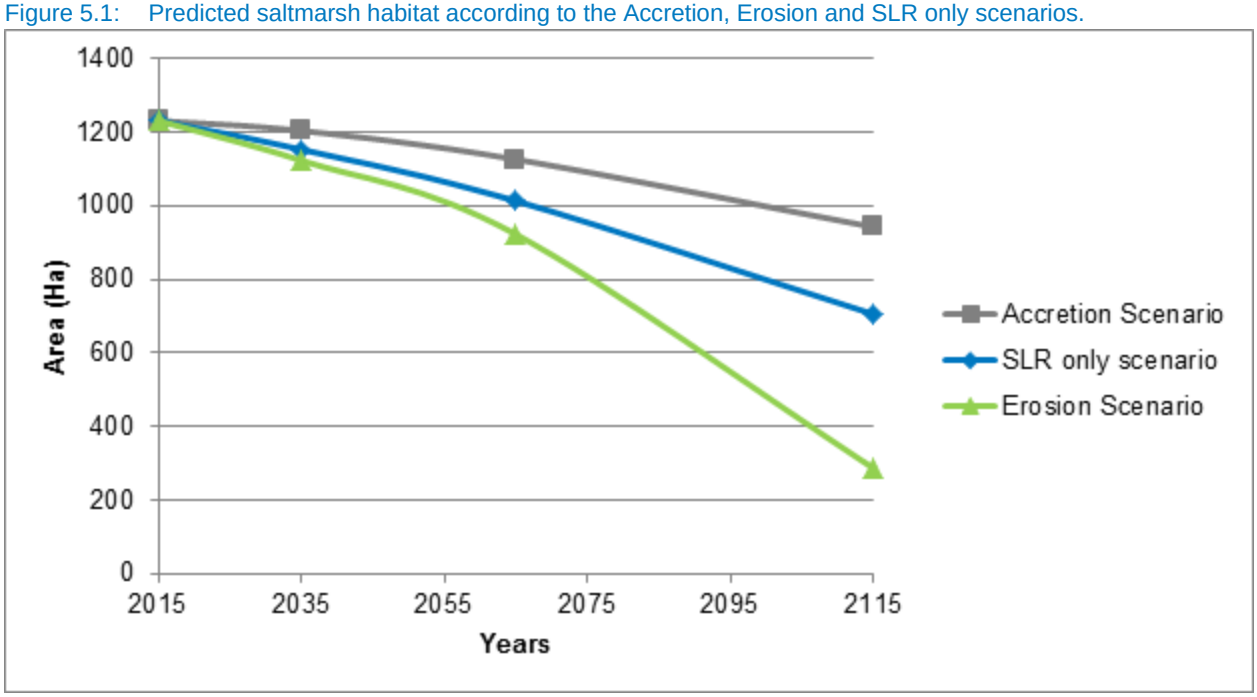
Table 5.7 and Figure 5.1 present a summary of the predicted saltmarsh habitat change (relative to 2015 baseline) over the next 100 years according to the three scenarios. The table also indicates the predicted habitat changes from the CHaMP. Significant changes can be observed between the results obtained during this study and those reported by the CHaMP during the first two epochs. A spatial comparison between the CHaMP and this study is not possible since no habitat maps are provided within the CHaMP, however, both studies are predicting similar habitat losses over 100 the year time period. Appendix B: presents a spatial comparison between scenarios. Appendix C to Appendix E presents: Scenario 1 predicted future habitat maps.

Table 5.7. Comparison of saltmarsh loss over 100 year using different methodologies

	Baseline Area (ha)	Area of change (ha)		
Methodology	2015	in 20 years' time	in 50 years' time	in 100 years' time
SLR only scenario	**1231**	-78	-218	**-526**
Accretion scenario	**1231**	-27	-105	**-289**
Erosion scenario	**1231**	-109	-309	**-945**
Greater Thames CHaMP results – relative to 2006 baseline	1370	-300	-240	-400

Source: Mott MacDonald, 2016

Figure 5.1: Predicted saltmarsh habitat according to the Accretion, Erosion and SLR only scenarios.



Source: Mott MacDonald, 2016

5.3 Mudflat results comparison

Table 5.8 and Figure 5.2 present a summary of the predicted mudflat habitat change (relative to 2015 baseline) over the next 100 years according to the three scenarios selected. The table also indicates the predicted habitat changes from the CHaMP.

The results obtained along this study indicate that the SLR scenario predicted habitat change lies between the accretion and erosion results, similar to those observed in the saltmarsh case. Once again, significant changes can be observed between the results obtained during this study and the reported by the CHaMP during the first two epochs. A spatial comparison between the CHaMP and this study is not possible since there are no habitat maps are provided in the CHaMP, however, both studies are predicting similar mudflat habitat change over a 100 year time period. Appendix B presents a spatial comparison between scenarios. Appendix C to Appendix E present Scenario 1 predicted future habitat maps.

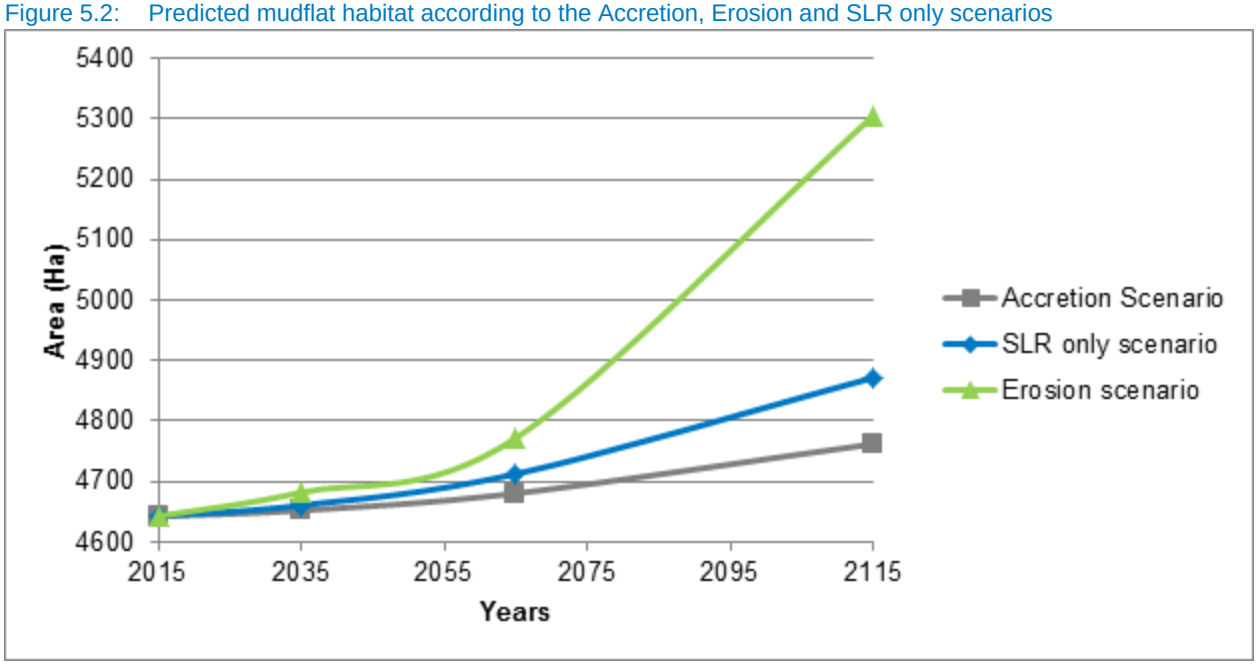
Table 5.8. Comparison of mudflats loss over 100 year using different methodologies

	Baseline Area (ha)	Area of change (ha)		
Methodology	2015	in 20 years' time	in 50 years' time	in 100 years' time
SLR only scenario	**4642**	18	70	**229**
Accretion scenario	**4642**	10	38	**120**
Erosion scenario	**4642**	39	130	**663**

	Baseline Area (ha)	Area of change (ha)		
Methodology	2015	in 20 years' time	in 50 years' time	in 100 years' time
Greater Thames CHaMP results – relative to 2006 baseline	4900	430	170	490

Source: Mott MacDonald, 2016

Figure 5.2: Predicted mudflat habitat according to the Accretion, Erosion and SLR only scenarios



Source: Mott MacDonald, 2016

5.4 Discussion of comparison between studies

The CHaMP is the most recent comprehensive assessment of coastal squeeze approved by Natural England. The results of this study presented show differences between predictions of saltmarsh and mudflat changes over time compared to the CHaMP.

General differences could be considered due to:

- **Input data**: The CHaMP used 2006 1D bathymetry (cross-sections) and different prediction for SLR rates (Defra, 2006) compared to this study.
- **Definition of habitat**: No clear definition is provided in the CHaMP of how the intertidal habitat has been defined in terms of the tidal frame.
- **Methodology:** The CHaMP is based on hydrodynamic and regime models. The results have been later interpreted through an Expert Geomorphological Assessment (EGA). Limitations and uncertainties of this methodology have been previously discussed. The methodology presented along this study relies on changes to elevation only and no morphological response of the estuary is considered.

In particular the CHaMP is predicting a significant loss of saltmarshes and gain of mudflats in the first epoch compared to this study. This is likely to be due to the fact that the CHaMP regime model assumes the main channel will deepen, and consequently widen, as a result of the increase in the tidal prism, causing the loss of the saltmarsh located close to the mouth, however this is difficult to verify due to lack of mapping data. Approximately 300ha of saltmarsh will be lost and the majority includes the undefended Medway islands near the mouth of the estuary.

In the medium term (approx. 20-50years) the CHaMP indicates saltmarsh loss is slower (with some gain). This is due to the model predicting that the middle reaches will continue to accrete, and therefore compensate against the losses of saltmarsh habitat in the first epoch.

However, according the EGA presented in the CHaMP, the Medway appears to be able to accommodate increasing sea level during the first epoch (0 to 20 years) due to its unconstrained morphology, without significant change in the habitat, similar to the results presented along this study. This is in contradiction with the discussion in the CHaMP.

The methodology adopted in this study does not consider the evolution or changes to the main channel and the response of the estuaries to the increased tidal prism, and this could account for the differences in results both for the saltmarsh habitat as for the mudflats during the first epochs. Overall the final changes in mudflat and saltmarsh over 100 years are similar for both studies.

6 Conclusion

As part of the Strategy a review of previous studies and literature relating to the current and future evolution of intertidal habitats within the Medway and Swale Estuaries was undertaken; this technical note presented the results of that review. Overall the review indicates that the geomorphological and hydrological changes occurring in the Medway and the Swale estuaries are difficult to predict over a large time scale, with conflicting conclusions regarding the potential for future accretion and erosion within the estuaries.

This technical note has outlined the methodology undertaken to re-assess the current day baseline and future changes in the extent of both saltmarsh and mudflat habitats within the Strategy area. This involved looking at three scenarios in order to assess the potential variability of habitat change over the next 100years in comparison with the CHAMP figures. The results of this are summarised in Table 6.1, Table 6.2 and Table 6.3 below.

Table 6.1. Comparison of saltmarsh loss over 100 years using different methodologies

	Baseline Area (ha)	Area of change (ha) relative to the baseline			
Methodology	2015	in 20 years' time	in 50 years' time	in 100 years' time	Remaining Saltmarsh Area after year 100 (ha)
SLR only scenario (1)	**1231**	-78	-218	-526	**705**
Accretion scenario (2)	**1231**	-27	-105	-289	**942**
Erosion scenario (3)	**1231**	-109	-309	-945	**286**
Greater Thames CHaMP results – relative to 2006 baseline	**1370**	-300	-240	-400	**970**

Source: Mott MacDonald, 2016

Table 6.2. Saltmarsh compensation requirements per epochs

	Area of compensation (ha)			
Methodology	0 – 20 years	20 – 50 years	50 – 100 years	Total compensation
SLR only scenario (1)	78	140	308	**526**
Accretion scenario (2)	27	78	184	**289**
Erosion scenario (3)	109	200	636	**945**
Greater Thames CHaMP results – relative to 2006 baseline	300	0 [gain of 60ha]	160	**400**

Source: Mott MacDonald, 2016

Table 6.3. Comparison of mudflats loss over 100 years using different methodologies

	Baseline Area (ha)	Area of change (ha)		
Methodology	2015	in 20 years' time	in 50 years' time	in 100 years' time
SLR only scenario (1)	**4642**	18	70	**229**
Accretion scenario (2)	**4642**	10	38	**120**
Erosion scenario (3)	**4642**	39	130	**663**
Greater Thames CHaMP results – relative to 2006 baseline	4900	430	170	490

Whilst the baseline habitat areas between this study and the CHaMP are similar, there some differences with the future predictions of habitat change between the two studies, particularly in the short and medium term (0-50 years). However in the long term (100 years) the magnitude of overall intertidal habitat change (mudflat and saltmarsh) is more similar.

Despite undertaking a more simple approach, the study results presented here provide a more recent assessment of coastal squeeze compared to the CHaMP. Therefore it is proposed that the results here are utilised for the Strategy development.

The results obtained in this study indicate that the Scenario 1 (sea level rise) predicted habitat change lies between the accretion and erosion results of Scenario 2 and 3. Considering the conflicting conclusions of future changes within the estuaries (and in the previous studies) Scenario 1 provides a precautionary way forward and is recommended for adoption for use within the Strategy. The results presented in this study should be used as an indication of the magnitude and direction of change and not absolute numbers.

References

ABPmer. 2008. Greater Thames CHaMP.

Burd, F.H., 1992. Erosion and Vegetation Change on the Saltmarshes of Essex and North Kent between 1973 and 1988. No. 42. In: Research and Survey in Nature Conservation. Nature Conservancy Council, Peterborough.

Cundy A.B., Lafite R., Taylor J.A., Hopkinson L., Deloffre J., Charman R., Gilpin M., Spencer K.L., Carey P.J., Heppell C.M., Ouddane B., De Wever S. and Tuckett A. 2007. Sediment transfer and accumulation in two contrasting salt marsh/mudflat systems: the Seine estuary (France) and the Medway estuary (UK). Hydrobiologia. 588 (1):125-134.

Deloffre, J. R. Verney, R. Lafite, P. Lesueur, S. Lesourd, A.B. Cundy. 2007. Sedimentation on intertidal mudflats in the lower part of macrotidal estuaries: Sedimentation rhythms and their preservation. Marine Geology. 241 (2007): 19–32

Halcrow, 2010. Medway and Swale Shoreline Management Plan - Appendix C: Baseline Process Understanding.

Halcrow, 2010. Isle of Grain and South Foreland Shoreline Management Plan review - Appendix C: Baseline Process Understanding.

JNCC. 2010. Handbook for Phase 1 habitat survey. A technique for environmental audit

Kent County Council (KCC), 1997. Kent Biodiversity Action Plan.

Kirby, R. 2013. The Long-term sedimentary regime of the outer Medway Estuary. Ocean & Coastal Management. 79 (2013): 20-33.

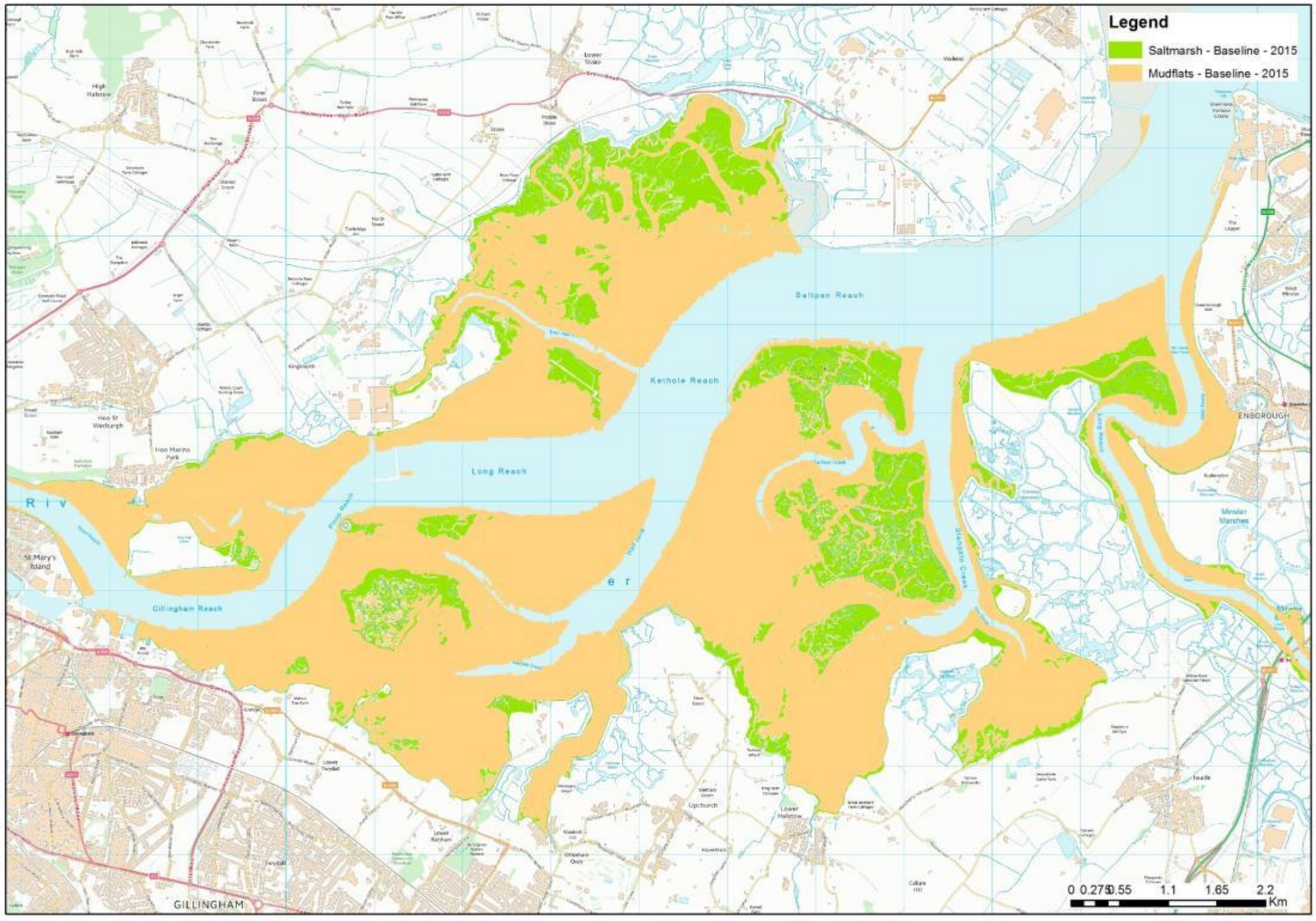
Natural England. 2015. User Guide for Natural England's Priority Habitats' Inventory version 2.1. 15th December 2015

Pontee, N 2013. Defining Coastal Squeeze – A Discussion. Ocean & Coastal Management Volume 84, November 2013, pp 204–207

Appendices

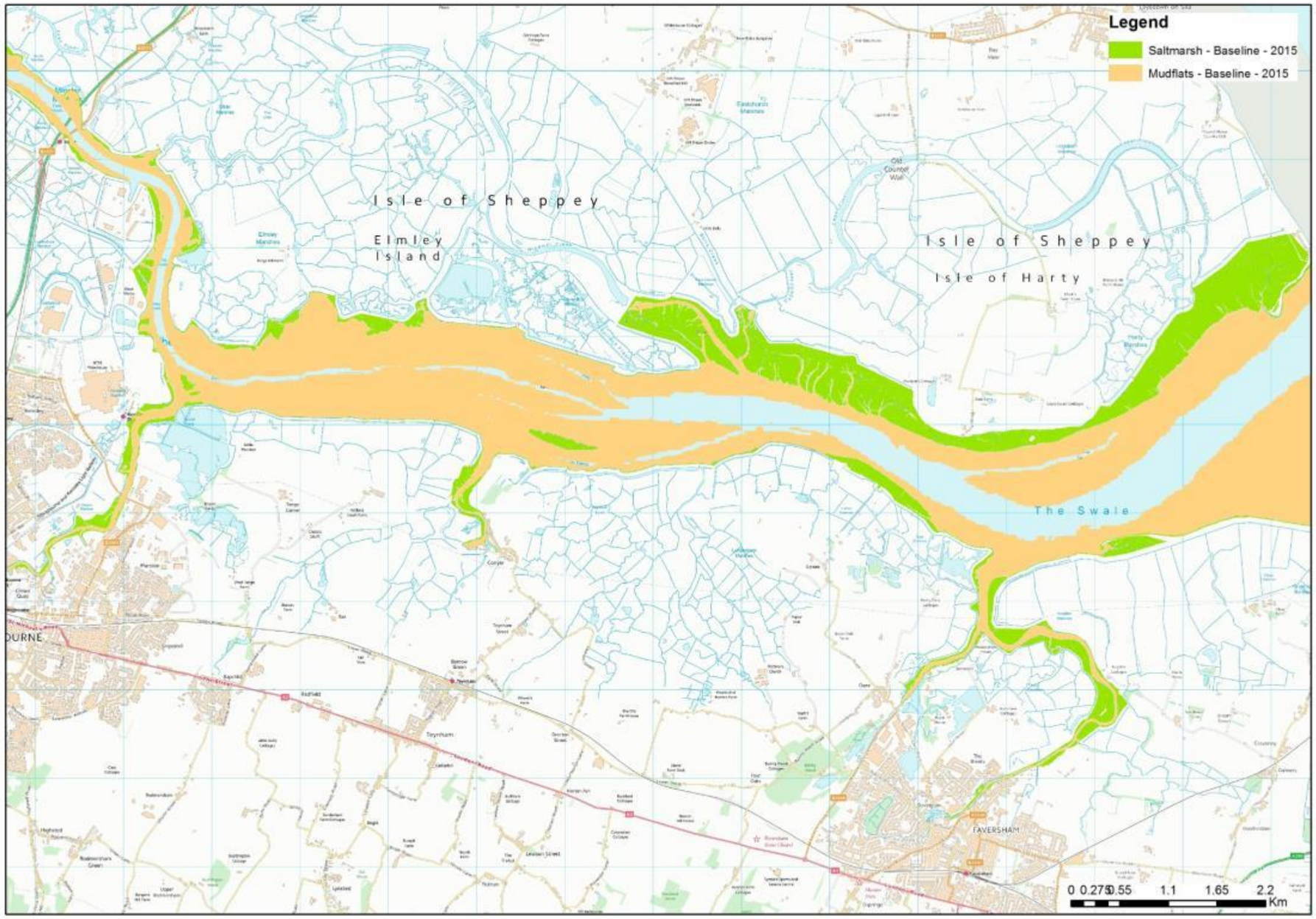
Appendix A. Baseline habitat maps

Figure A.1: Baseline habitat - Medway



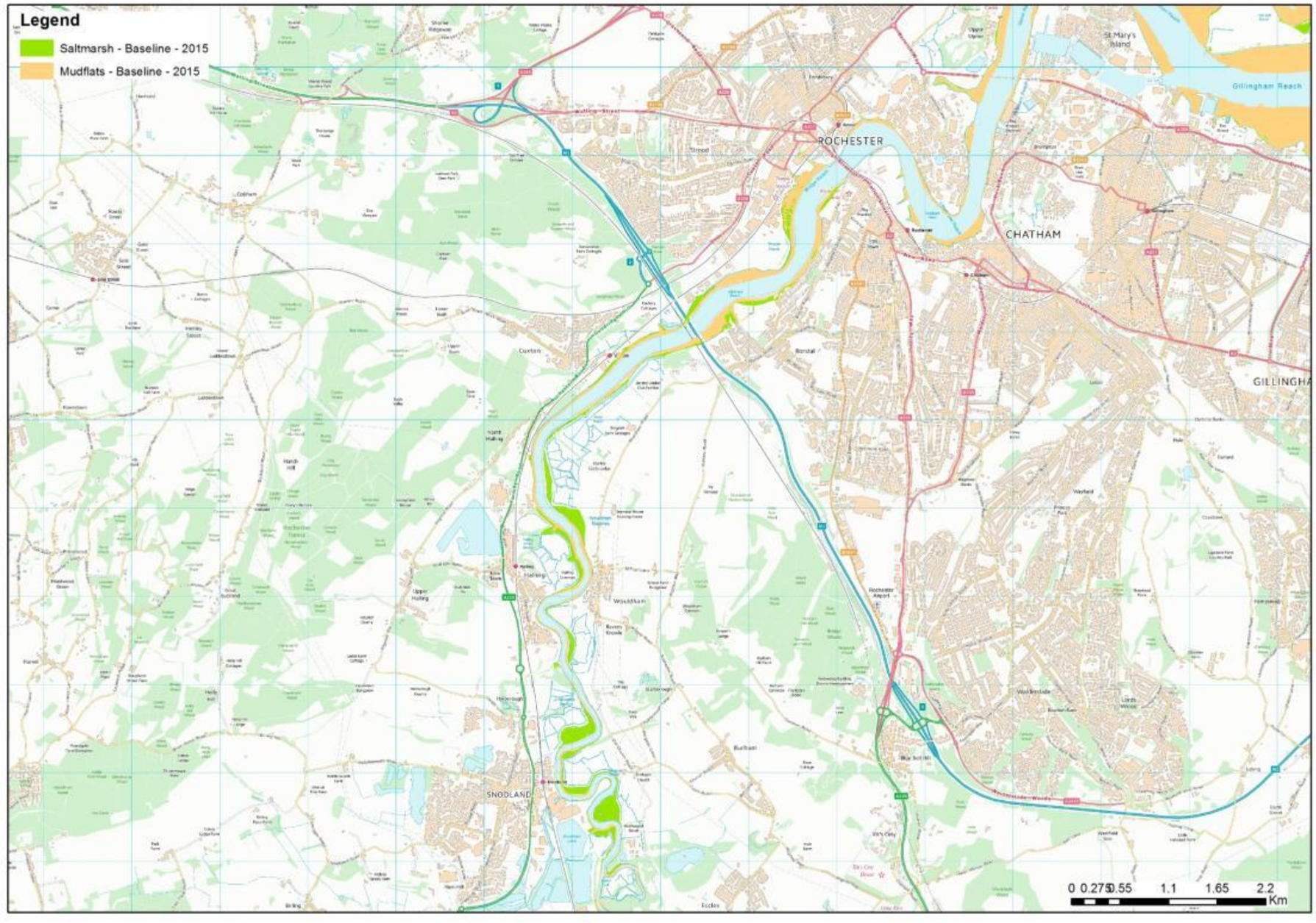
Source: Mott MacDonald, 2016

Figure A.2: Baseline habitat - Swale



Source: Mott MacDonald, 2016

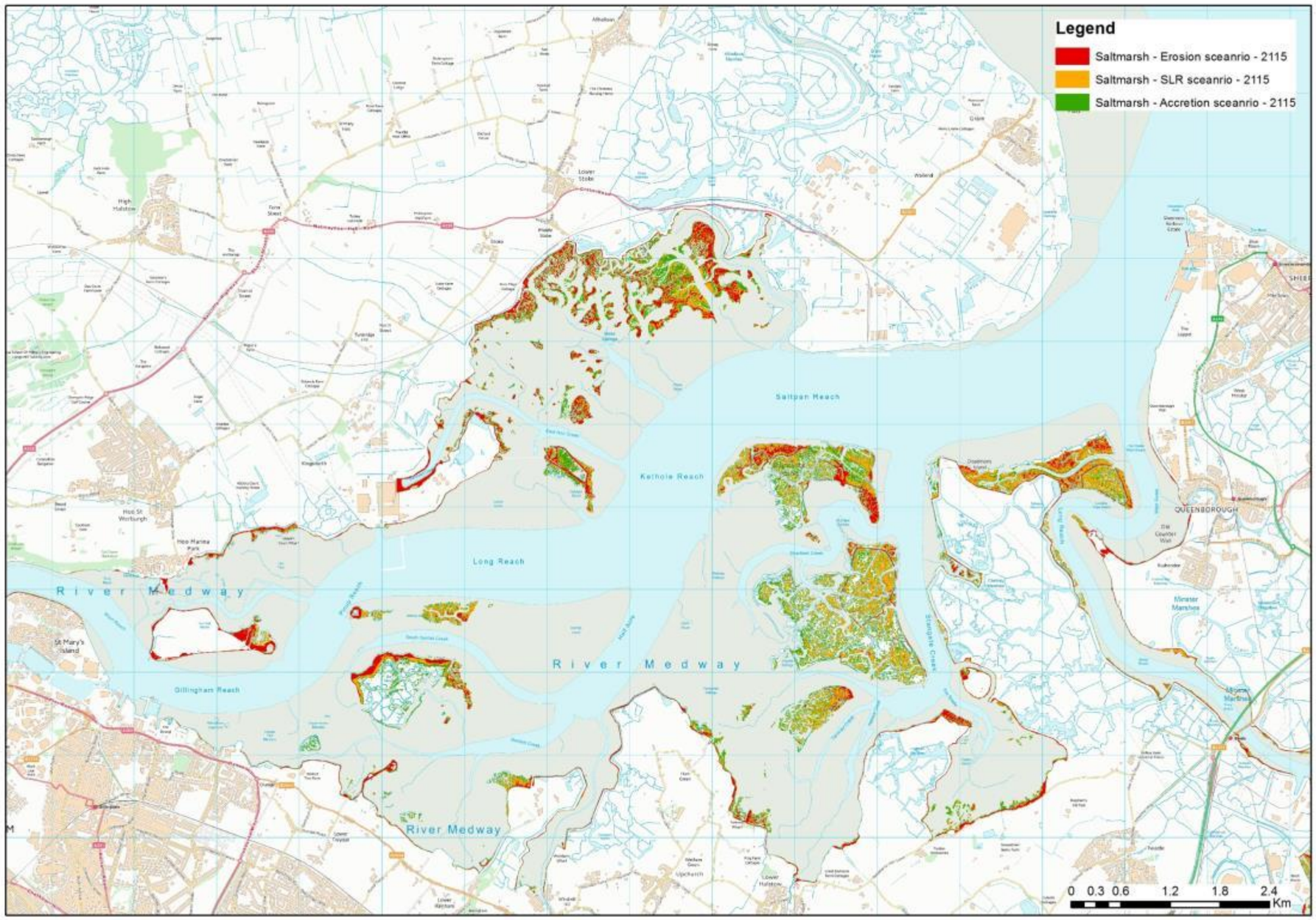
Figure A.3: Baseline habitat – Upper Medway



Source: Mott MacDonald, 2016

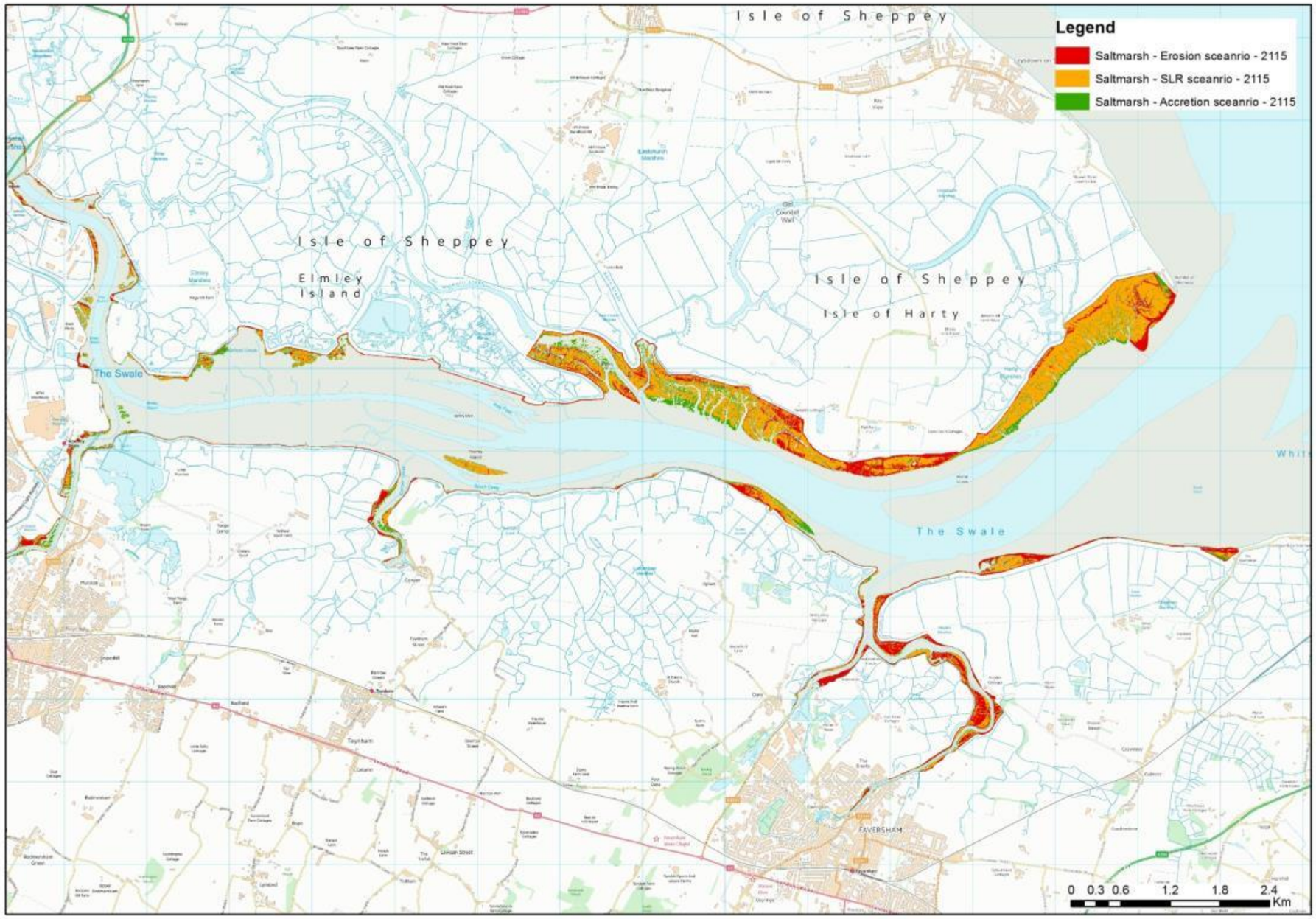
Appendix B. Comparison between scenarios

Figure B.1: Predicted saltmarsh habitat according to the Accretion, Erosion and SLR scenarios in the Medway Estuary in 2115



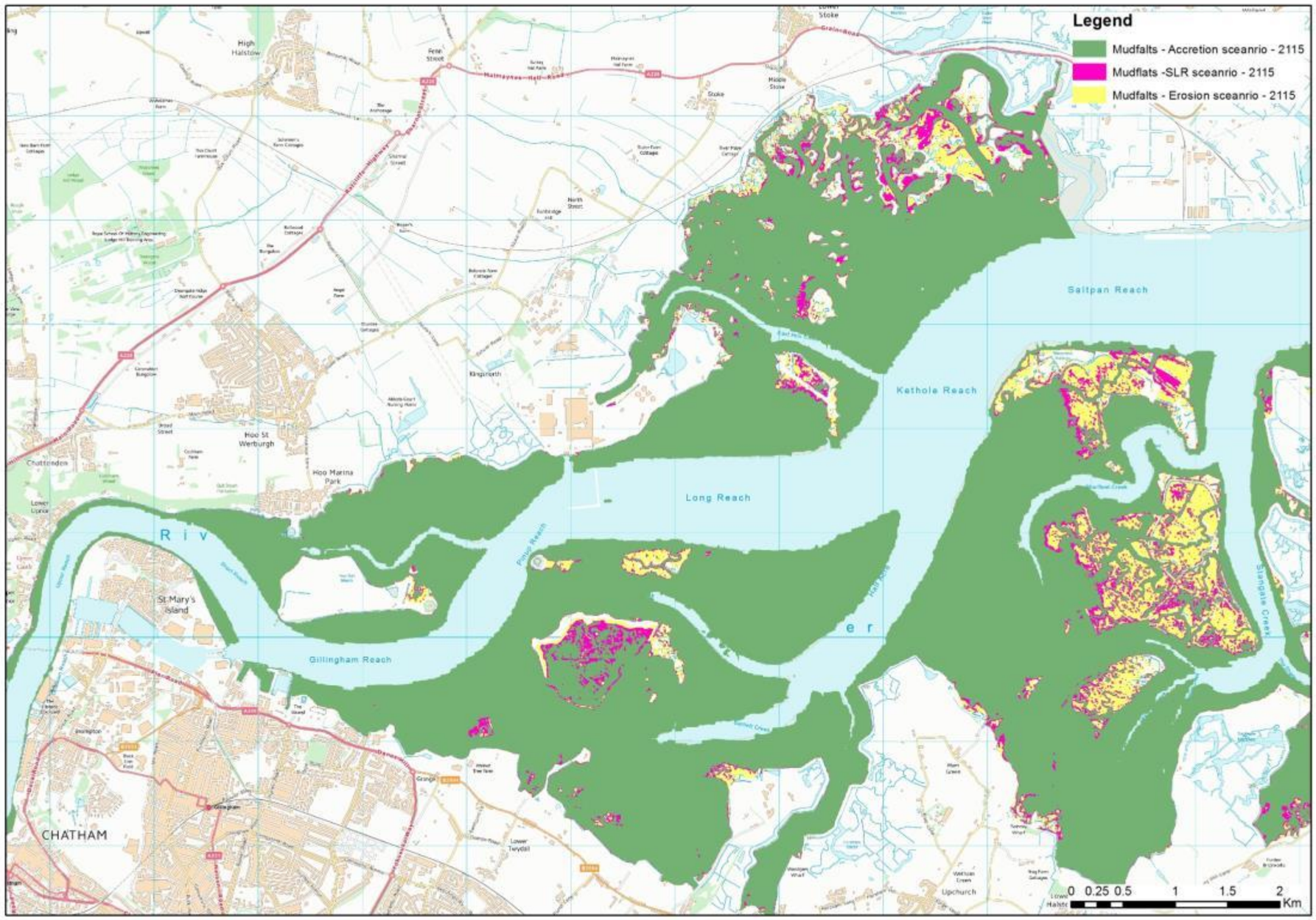
Source: Mott MacDonald, 2016

Figure B.2: Predicted saltmarsh habitat according to the Accretion, Erosion and SLR scenarios in the Swale Estuary in 2115



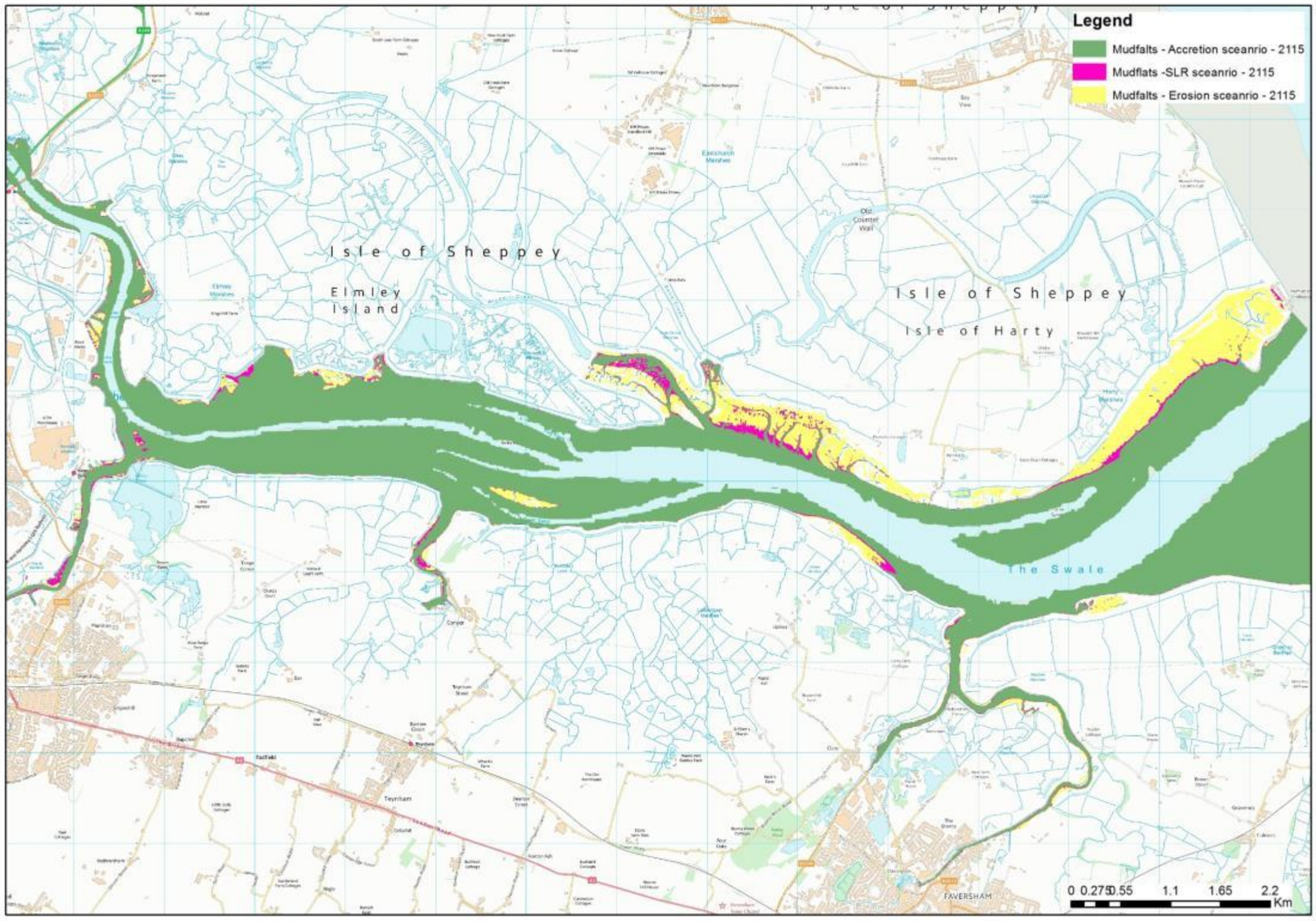
Source: Mott MacDonald, 2016

Figure B.3: Predicted mudflat habitat according to the Accretion, Erosion and SLR scenarios in the Medway Estuary in 2115



Source: Mott MacDonald, 2016

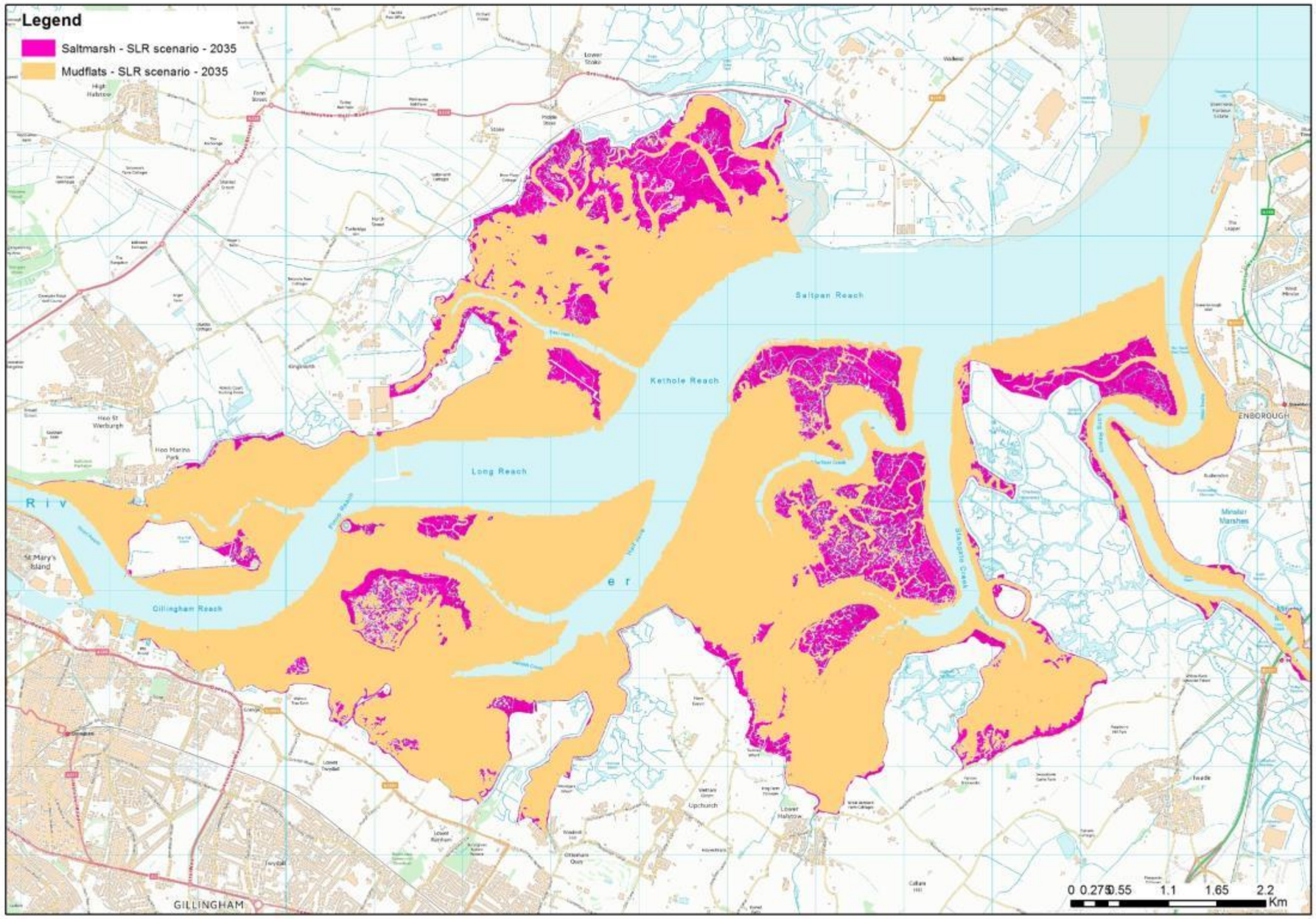
Figure B.4: Predicted mudflat habitat according to the Accretion, Erosion and SLR scenarios in the Swale Estuary in 2115



Source: Mott MacDonald, 2016

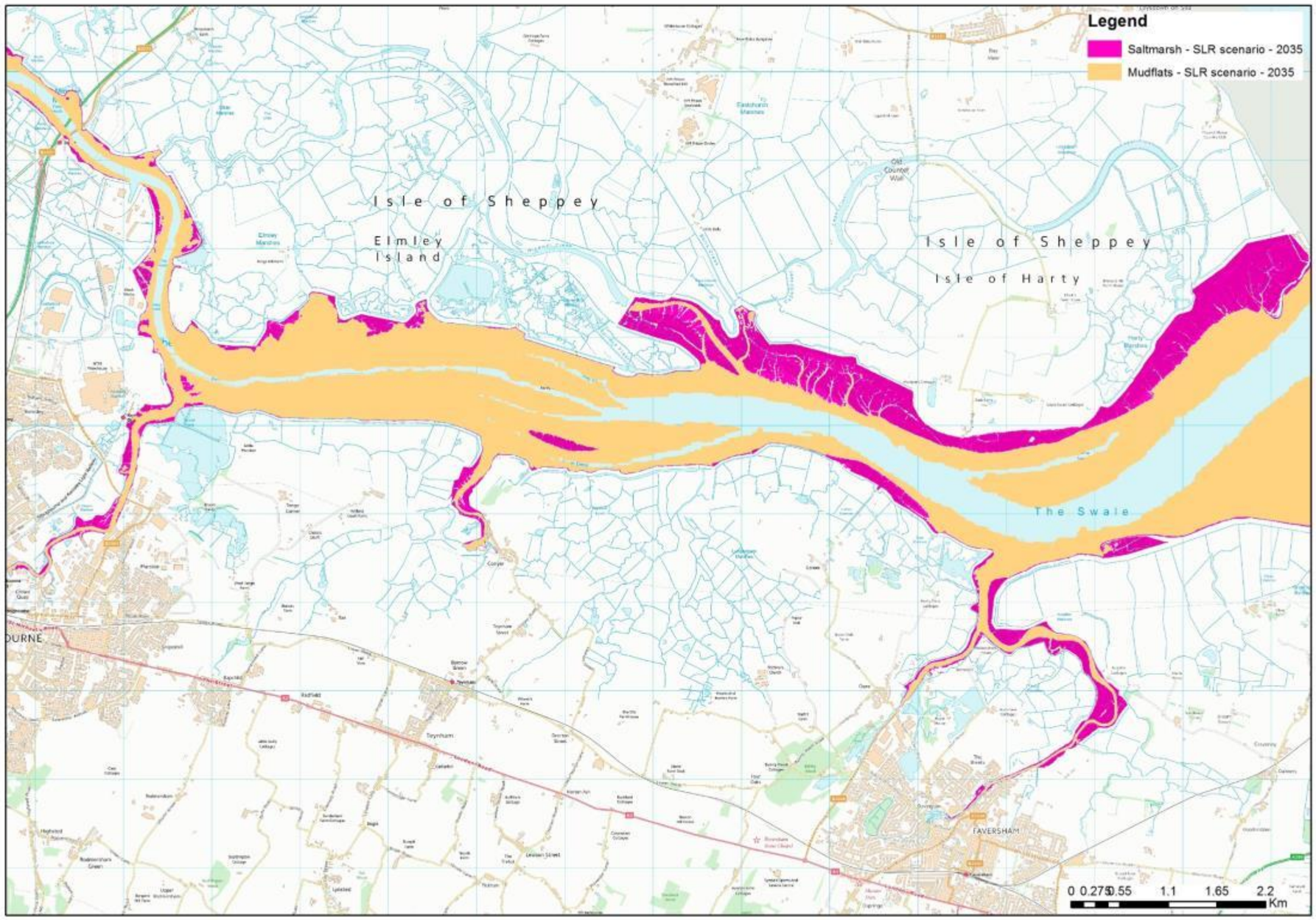
Appendix C. Scenario 1 – 2035 predicted habitat

Figure C.1: Scenario 1, 2035 habitat - Medway



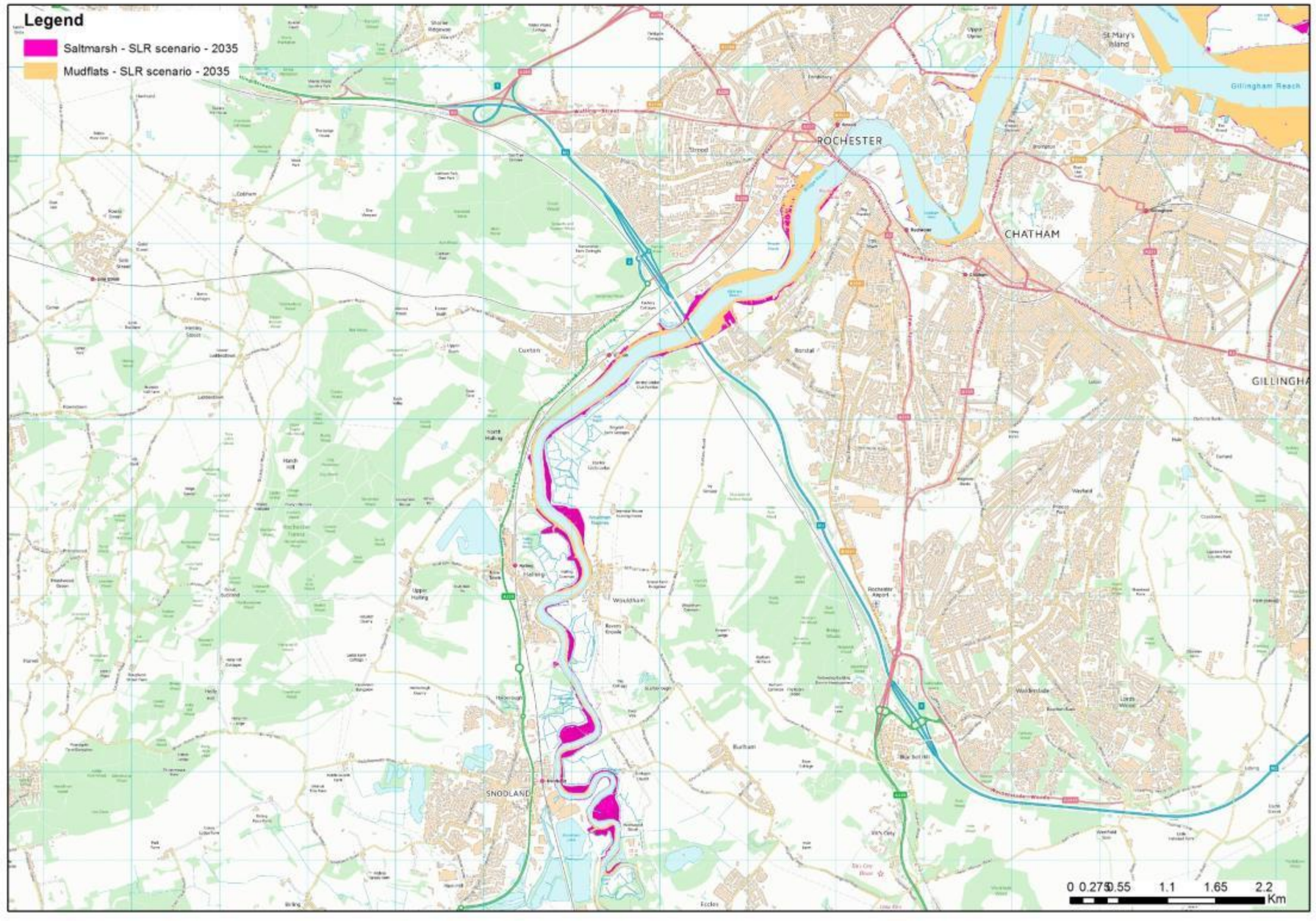
Source: Mott MacDonald, 2016

Figure C.2: Scenario 1, 2035 habitat - Swale



Source: Mott MacDonald, 2016

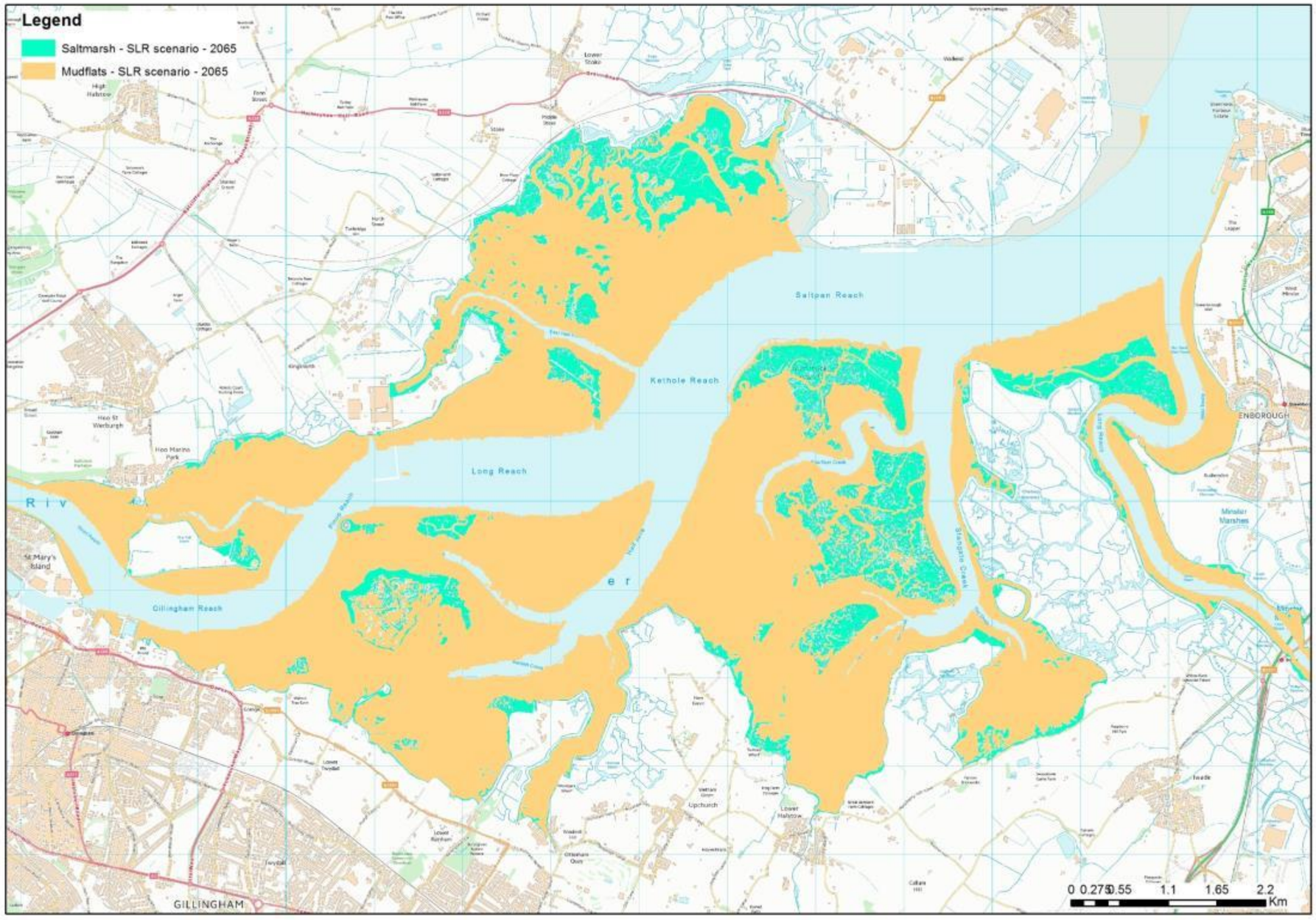
Figure C.3: Scenario 1, 2035 habitat – Upper Medway



Source: Mott MacDonald, 2016

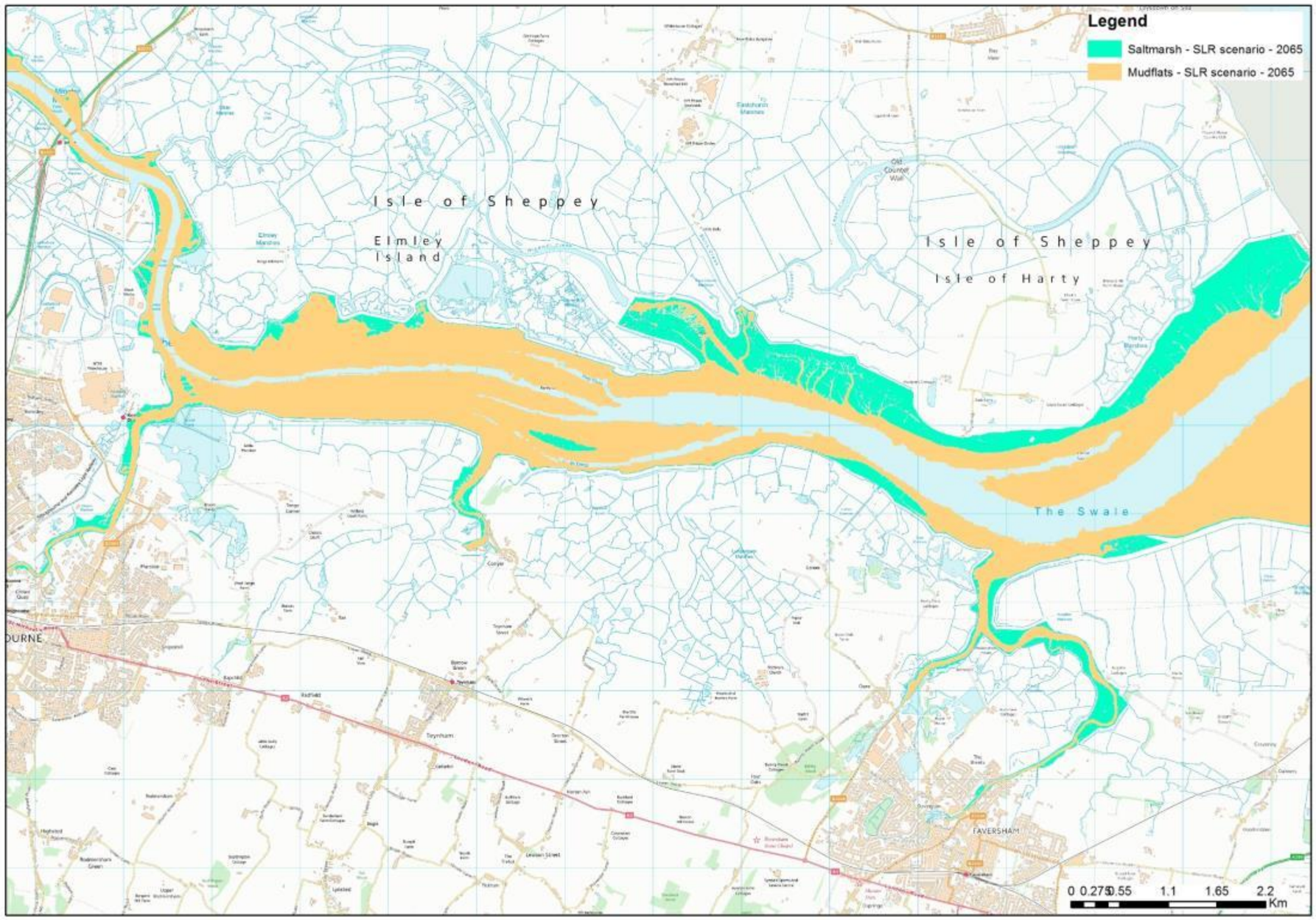
Appendix D. Scenario 1: 2065 predicted habitat

Figure D.1: Scenario 1, 2065 habitat - Medway



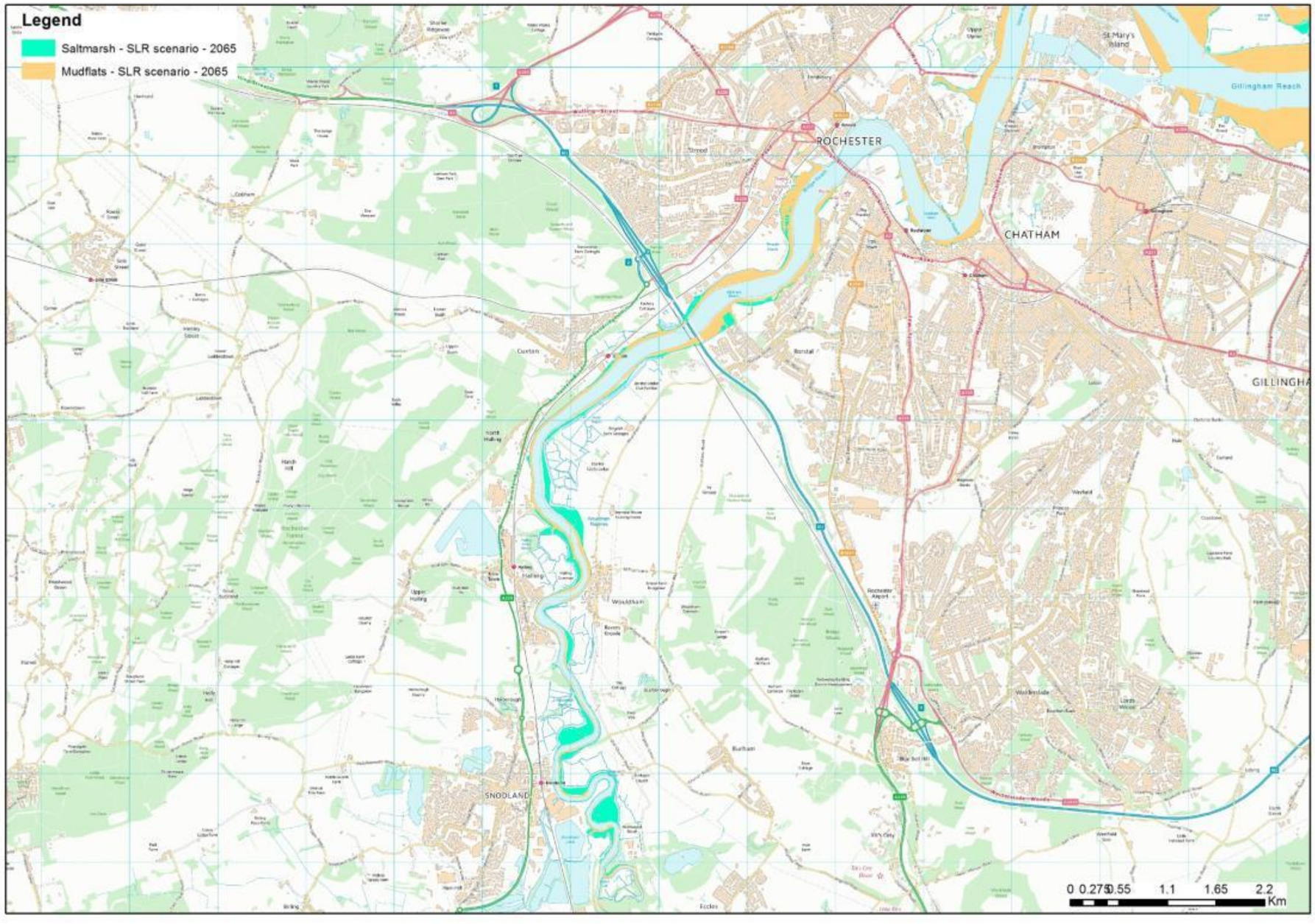
Source: Mott MacDonald, 2016

Figure D.2: Scenario 1, 2065 habitat - Swale



Source: Mott MacDonald, 2016

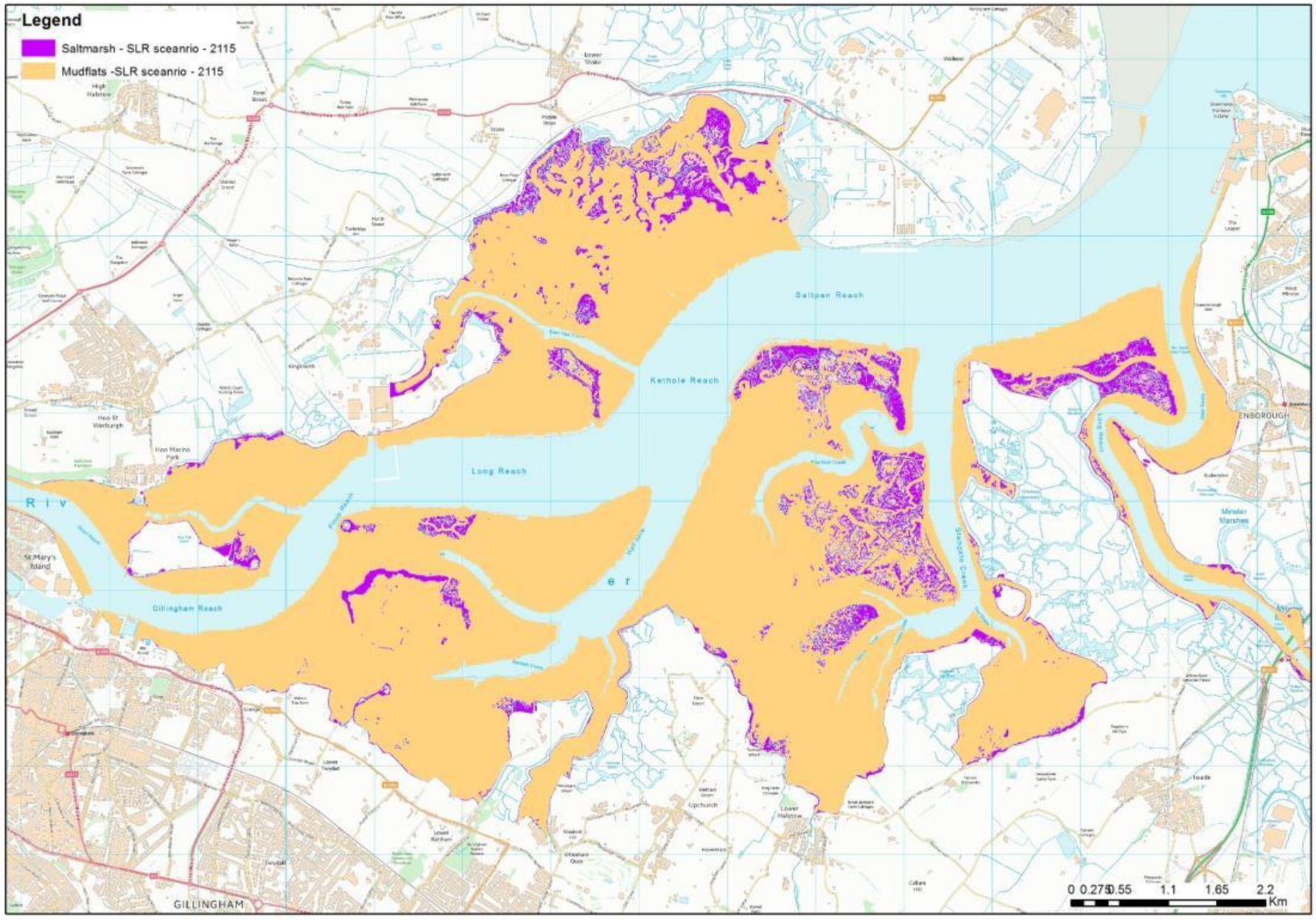
Figure D.3: Scenario 1, 2065 habitat – Upper Medway



Source: Mott MacDonald, 2016

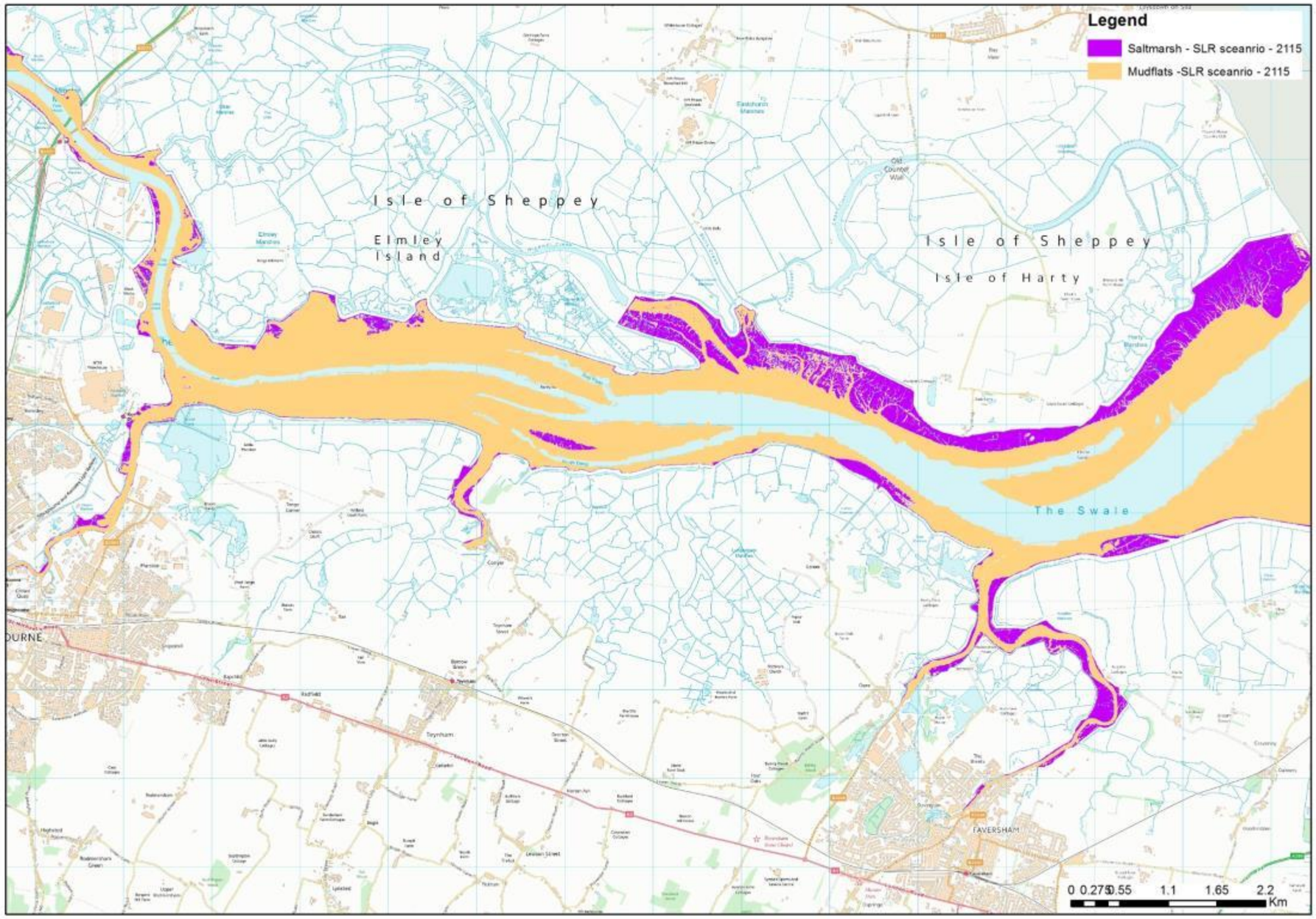
Appendix E. Scenario 1: 2115 predicted habitat

Figure E.1: Scenario 1, 2115 habitat - Medway



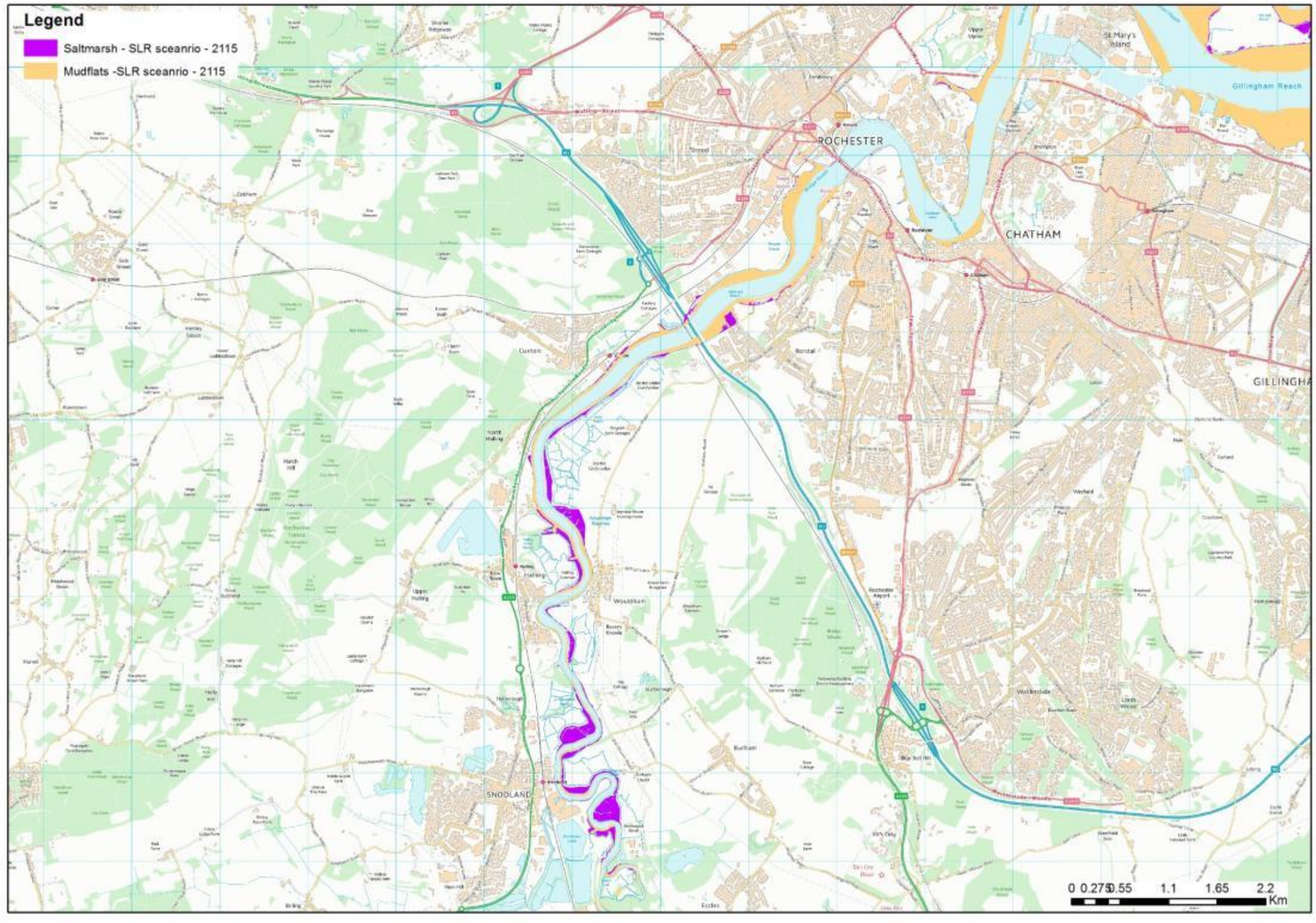
Source: Mott MacDonald, 2016

Figure E.2: Scenario 1, 2115 habitat - Swale



Source: Mott MacDonald, 2016

Figure E.3: Scenario 1, 2115 habitat – Upper Medway



Source: Mott MacDonald, 2016